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ULTRA-VIOLET LIGHT IN THE TREATMENT OF OPHTHALMIC DISEASE

I.—GENERAL PHOTOTHERAPY

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EARLY in 1922, in an endeavour to co-ordinate on a scientific basis experimental and clinical studies which were beginning to attract considerable attention, the Medical Research Council instituted a Committee on the "Biological Action of Light" under the chairmanship of the late Sir Wm. M. Bayliss. In the autumn of 1925, under the aegis of this Committee, at the instigation of Sir John H. Parsons, an ultra-violet clinic for the treatment of diseases of the eye was instituted at the Royal London Ophthalmic Hospital. Since its institution a large number of patients, representing many various conditions, has been treated, some with success, some with failure; but on the whole with such results as have led to the establishment of the clinic as a recognized part of the hospital practice. Preliminary papers (1926, *a* and *b*) have already been published dealing in a tentative manner with the earlier results which were obtained with this method of therapy in the first seventy cases which were treated; but inasmuch as the technique has now become standardized, and as it is possible to deal with the matter with the added authority of considerably extended

experience, it may be of interest to review the matter in the light of the following series of four hundred and twenty-five cases. These are classed into the two divisions in which treatment by ultra-violet radiation may be considered: general phototherapy, in which the patient is subjected to artificial sun-baths, and local phototherapy, in which the eye itself is directly radiated. To each of these a short paper will be devoted.

Throughout—for reasons closely akin to ignorance—theoretical matters will be avoided as much as possible; the purpose of these papers is entirely clinical. It is no secret that the practice of ultra-violet phototherapy is still to a large extent empirical, although in many directions it is controlled and guided by experiment; but in extenuation it may be urged that the same may be said of most of the advances in therapeutics. And in any case, whatever the theoretical considerations involved, the method, when employed within limits, has justified itself in practice. It is to be hoped that some of the present enthusiasm which exists in some quarters for its well-nigh universal use will be damped in the future; but at the same time it is reasonably sure that in certain directions this enthusiasm will be strengthened and augmented.

The biological effects of ultra-violet radiation

Ultra-violet light appears to exert a complex effect upon the subject radiated, the response being partly photo-chemical and partly photo-electrical. The chemical effect embraces photo-reactions involving the proteins and sterols in or near the surface layers of the skin; the products of the first of these probably increase the non-specific immunity of the body, those of the second seem to have a pronounced effect on vitamine activity.* The intimate nature of these reactions is very imperfectly known, and there are almost certainly others as yet wholly uninvestigated. Recent work is showing that the photo-electric effect which accompanies the radiation of living tissues is much greater than had been anticipated; so great, indeed, that it cannot fail to produce a considerable effect upon the organism, an effect which is probably to a large extent responsible for the undoubted stimulating influence of suitable doses of light.

Clinically the most obvious effect of radiation is the production of an erythema in the skin. It appears after a latent period, the duration of which varies inversely as the intensity of the radiation employed, but which averages four to eight hours, and its maximum

* Xerophthalmia, which is produced in rats by feeding on a diet deficient in vitamine A, is rapidly cured by ultra-violet radiation (McCollum and Davis, 1914; Ellis and Macleod, 1922). The similar effect of radiation in rickets is well known (Hume, 1922; Hess and Unger, 1923; Eckstein, 1924; and many others).

intensity is usually reached in about thirty hours. For clinical purposes it may be divided into four degrees:

First degree: an extremely slight reddening of the skin, not followed by any exfoliation, and involving transient subjective symptoms.

Second degree: a faint but definite reddening, followed by a fine granular desquamation, and involving a varying degree of itching and mild irritation.

Third degree: a marked erythema, followed by coarse, flaky desquamation and pigmentation, accompanied by considerable itching and smarting.

Fourth degree: a deep and intense erythema, with oedema and the formation of blisters, accompanied by considerable pain.

The reaction in the skin is characterized by swelling in the deeper layers of the epidermis and marked capillary dilatation, the lumen of these vessels being increased two, four, or six times. This vascular reaction leads to stasis and diapedesis, with the formation of a varying amount of oedematous fluid which may collect in droplets or vesicles to form blisters. Subsequently, owing to coagulation of the proteins in the epidermal cells, necrosis occurs, and these desquamate. Meantime, especially with rays slightly longer than 2,900 A.U., deposits of melanin tend to accumulate round the nuclei of the basal epidermal cells, and a greater or less degree of pigmentation appears, a phenomenon which is largely absent if the shorter wave-lengths are employed.

A second and extremely important effect of radiation is the production of an increase in the bactericidal power of the blood (Colebrook, Eidinow, and Hill, 1924). This is a very definite result. It appears that the erythema dose of light applied to an area of the skin increases the bactericidal properties of the blood flowing through the site of radiation, and in this way the blood in the general circulation develops greater bactericidal activities (Eidinow, 1927); thus blood from a suitably radiated subject when inoculated *in vitro* with staphylococci remains sterile while that from unradiated controls grows colonies profusely. Moreover, by testing its effects on typhoid agglutinins a rise in the antigenic properties of blood after radiation may be demonstrated (Sonne, 1920). There are further histological and serological changes in the blood. A mild degree of radiation has little or no effect on the cellular composition (Jaulmes, 1925), but more intense doses result in a slight erythrocytosis (Russell, 1927), an increase in haemoglobin, an increase in platelets (Kramer and Drew, 1923), a decrease in polymorphonuclear cells, an increase in lymphocytes (Koopman, 1924), and a marked increase in eosinophiles. The

calcium, phosphorous and iron in blood are increased (Orr, Holt, etc., 1922; Lesné, de Gennes, and Guillaumin, 1923; Kramer, Casparis, and Howland, 1922; etc.), the sugar is increased except in those cases where it is pathologically high (Frenkel-Tissot, 1920), the proteins are refractometrically changed (Kroetz, 1924), and the pH is raised (Balderrey and Barkus, 1924). The parathyroid glands are increased in size (Grant and Gates, 1924), the iodine content of the thyroid is increased, and the general metabolism is accelerated, the carbon dioxide tension of the alveolar air being raised (Ederer, 1922) and the nitrogenous excretion augmented (Pincussen, 1924).

Dosage

From time to time it has been suggested that ultra-violet dosage should be standardized by some "actinometer" corresponding in principle to the "pastille dose" in the application of X-rays. Various devices have been suggested, none of which is entirely satisfactory; they depend on some photo-chemical reaction brought about quantitatively by ultra-violet light, in the course or at the end of which, some definite and easily determinable change, such as a colour change, takes place.

Webster, Hill, and Eidinow (1924) recorded a number of such suggested reactions and concluded that the most satisfactory was the bleaching of a solution of methylene blue in aqueous acetone. The photo-chemical decomposition of oxalic acid sensitized by uranyl salts, first investigated by Mathews and Dewey (1913), has been standardized for actinometry by Anderson and Robinson (1925), and with a different technique by Moss and Knapp (1925-27). MacKenzie and King (1926) described a method based on the photo-decomposition of carbon tetrachloride, the liberated chlorine being estimated quantitatively in the presence of potassium iodide by the determination of the equivalent amount of liberated iodine. The photo-chemical decomposition of hydrogen peroxide has also been carefully investigated (Henri, 1911; Henri and Wurmser, 1913; Mathews and Curtis, 1914; Anderson and Taylor, 1923); and similarly a buffered solution of potassium nitrate has been used (Gillam and Morton, 1927), the liberated nitrite being determined colorimetrically. The majority of these photo-chemical reactions, however, are complex, and direct evidence of the attainment of a definite stage is difficult to accept. Moreover, every source of ultra-violet radiation has its own spectral energy distribution, and every reacting substance its own individual absorption spectrum, and every photo-chemical change its own spectral distribution of efficiency; the energy measured quantitatively is therefore frequently limited to a small spectral range,

and may bear little true relation to the total abiotic radiation which may be emitted at the time.

Apart altogether from their intrinsic defects, it is doubtful if any such reaction as these will be of service clinically, since the reaction to light is very individualistic, and varies considerably from patient to patient; moreover, in the same patient during a course of treatment a certain immunity gradually develops, and each dose has to be varied on the basis of the reaction of the last. Generally, fair people respond to radiation more rapidly than dark, the reddish most readily of all, the young more than old, females than males, and a thin, dry, pale skin than an adipose, moist, pigmented skin. The reaction varies also with the part of the body treated; the face and hands are less susceptible than those parts habitually covered with clothes, the back and the posterior aspect of the limbs are more responsive than the chest, abdomen, and the anterior surface of the limbs. Further, there is a definite individual variation which it is impossible to assess accurately until each patient is tested and observed separately. It is true that the great majority respond within a reasonably narrow margin, but these considerations render a routine dosage based on a standard test inexpedient and in some cases unsafe.

The only systemic effect of which we have accurate knowledge and which lends itself to exact quantitative estimation is the increased bactericidal power of the blood which follows radiation; up to a certain intensity of radiation this gradually increases, beyond this limit a negative phase is induced and the haemo-bactericidal power falls, an effect which can be correlated with the mental and physical depression which too intensive doses of light invariably produce. It would seem reasonable to attempt to attain the dosage which will give the maximum height in this curve. The most readily observed effect of radiation is the production of the erythema on the skin, and fortunately this has been correlated with the changes in the haemo-bactericidal power (Eidinow, 1926). It appears that the optimum effect is obtained with radiation of such intensity as produces a mild erythema (of the second degree) which is followed by a fine desquamation over an area of about one-quarter of the body surface. The initial dose is therefore estimated by exposing four small areas on the arm or the back to the lamp for periods of two, four, six, and eight minutes respectively; the following day these areas are observed and the dosage is commenced whose duration is judged from the standard thus obtained. Thereafter the body is divided into three areas, the chest and front of the abdomen, the back, the front and the back of the legs, and each of these is irradiated on alternate sittings, the dose on each occasion being gradually increased by an amount based on the reaction obtained at the previous sitting.

The dose, of course, varies directly with the intensity of the ultra-violet output of the lamp, inversely as the square of the distance at which the patient is away, directly as the time of exposure, and also with the direction in which the patient is sitting with regard to the rays. The amount of reaction varies with the quantity of ultra-violet energy actually received, and it does not make any difference in practice whether the dose is varied by altering the time of exposure or the distance of the patient (Angus, 1927). With a mercury vapour lamp (K.B.B. atmospheric) running on 220 volts 2 to 3 ampères, with the patient sitting normally to the incident rays at three feet distance, the average duration of a commencing dose is three minutes.

Technique

The general scheme of treatment recommended is as follows, and it may be taken as a standard, subject to individual variations with the requirements of each particular case. After the initial dose has been obtained, the patient attends the clinic three times a week, when one of the three areas specified above is exposed, the greater part of the body being thus radiated once a week. At the end of this time the slight reaction has died down and the fine desquamation has passed off leaving fresh and light-sensitive skin available each time the alternating areas come up for re-exposure. By this routine an optimum effect is produced over an optimum area, a maximal increase in the haemo-bactericidal power is obtained three times a week, and as far as we can judge, an optimal effect is obtained from the course of treatment, while the patient is kept almost continually under the influence of the light.

Treatment is begun with the mercury vapour lamp,* the dose being gradually raised from the initial three, to nine or twelve minutes as the patient develops a certain degree of tolerance. After the first few weeks, usually somewhere between the ninth and fifteenth treatment, depending on the rapidity of the development of this immunity, the carbon arc is employed. The spectrum of the mercury vapour lamp is rich in the shorter ultra-violet rays while the carbon arc gives a more intense output in the longer and more deeply penetrating ones, and these seem to be the most useful at this stage. Moreover, in the practice of a large clinic the latter is the more easily worked; for while two patients can be treated simultaneously with the mercury lamp, six to ten can be accommodated with the carbon arc. Further, the dosage required is considerably longer, and having thus a greater margin of safety, has to be less carefully regulated. With simple carbon poles the output of ultra-violet is relatively small, but this can be increased by coring the carbons with various metals. Of the

*The apparatus used is obtainable at Theodore Hamblin, Ltd., 15, Wigmore Street, London, W.1

various materials used tungsten is the most powerful, but a tungsten arc requires a great deal of attention and the strength of its radiation to some extent defeats its own ends. The practice in the clinic is to have one pole of the arc composed of plain carbon and the other cored with iron and cerium; with this, after a three weeks' course of the mercury lamp, the initial dose averages fifteen minutes at a distance of four feet. This is employed until twenty treatments in all have been given, the duration of exposure increasing from twenty to twenty-five or thirty minutes. Thereafter, if the state of the eye permits it, the course of treatment is stopped, and the patient is given two or three weeks rest whilst being kept under observation; at the end of this time, if it is at all indicated, a second course is started after a manner similar to the first except that the carbon arc is introduced a week or so earlier, and the dosage has usually to be increased more rapidly. A similar rest follows, and, if necessary, further courses can be given.

General Effects of Radiation

Apart from the local effect on the diseased condition in the eye the general tonic effect of ultra-violet radiation is very marked in the great majority of cases. Almost invariably one is told that the patient feels better and stronger and is in every respect more fit. Weight is put on, sleep improves remarkably, and the appetite is increased. There seems to be a certain definite effect upon chronic constipation, apart from the relief of the symptoms of auto-intoxication. The continuous stimulation of the capillary system of the skin reacts upon the whole vascular system, stimulates the vaso-motor reflexes, and assists in the adequacy of the temperature-regulating mechanism. Anaemias are benefited, the endocrine glands are stimulated, the general metabolic rate is increased, and these together with the raising of the general immunity of the body make the method of therapy a good adjuvant to other methods of treatment, and frequently seems to turn the scales in the course of a chronic illness especially in a debilitated or unresponsive patient. On the whole, the best response is seen in children, particularly those inhabiting crowded and sunless areas in industrial neighbourhoods.

Not only is this stimulation apparent on the physical side, but the mental aspect of the patient shares in the feeling of well-being and many of the exhilarating effects of a holiday in a sunny climate may be appreciated. Indeed, in the assessment of the progress of a case this factor undoubtedly leads the patient astray on occasion, giving him the impression that rapid progress is being made, and it is easy for the observer to share in his enthusiasm; but it would be difficult to deny, more especially in diseases of the

eye involving deterioration of vision, that this is a good thing; while the lessening of fatigue, the mental stimulation, and the alleviation of insomnia are undoubtedly assets of considerable value. Particularly in the case of children are these effects noticeable. It is no uncommon thing for a mother to remark enthusiastically and spontaneously soon after the commencement of treatment that her child has become altered in disposition, has become more tractable, or is getting on better at school; while more definite effects can be noted, as (in adults) the return of potency or (in hitherto sterile women) the occurrence of conception.

Dangers

The method of treatment, however, is not without its dangers. The most important of these is overdosage or injudicious dosage; it is also the most common. The absence of progress or its slow advent tempts one to increase the dosage, a procedure which usually results in making matters worse.

General Effects. Overdosage.—The symptoms of overdosage are, initially, a vague feeling of "out-of-sorts," a general depression instead of a feeling of well-being. Immediately after treatment drowsiness and fatigue are experienced followed some hours later by a loss of energy and appetite, lassitude, headache, nausea, irritability, and (which is significant) a loss of sleep. Instead of an increase, there is a loss of weight; this is one of the best methods whereby to gauge the effect of treatment and the suitability of the dosage.

Idiosyncrasy.—A certain number of people possess a definite idiosyncrasy to light, and develop these symptoms of overdosage while the exposures are kept well within the limits already prescribed. Such cases derive no benefit from the usual doses, which should be curtailed until a stimulating effect is evident. Even although no erythema is excited under these conditions, many of these subjects react quite well, a subliminal dose having the same effect as the usual dose in an individual with the ordinary response. In most of these cases there is a very sharp critical point which must not be passed, although towards the end of treatment a considerable amount of tolerance may be gained. A complete inability to tolerate light at all does occur, but it is rare; and such persons are usually similarly affected by more than the average amount of sunlight on a bright day in summer.

Low Blood-pressure.—Patients with low blood-pressure almost invariably require smaller doses than the average, and in them the symptoms of overdosage can readily be produced. Usually

after radiation in all cases the blood-pressure falls slightly, the systolic about 6 to 8 and the diastolic 3 to 4 mm. Hg.

Pyrexia.—In febrile patients great care must be taken with the dosage; and as a general rule the presence of a temperature may be taken as a contra-indication to treatment.

Menstruation.—During menstruation the bactericidal power of the blood is usually lower than normal, and in many cases ultra-violet radiation during this time appears to make this worse (Hill and Eidinow, 1925). It is frequently observed that women in the course of treatment who usually experience a tonic effect from radiation, complain of increased languor and malaise. It is probably not advisable to stop treatment altogether during the periods, but, especially if any of the symptoms of overdosage are complained of, considerably smaller doses should be given.

Special Effects. Dangers to the Skin.—Overdosage giving an erythema of the third or fourth degree gives rise to more discomfort than danger. The skin becomes very tender and oedematous, there is profuse and sometimes repeated desquamation, and large blisters may be formed; while, with very excessive doses, an acute but transient dermatitis may occur. In all cases which have been reported, however, complete healing without scarring has resulted (see McCormac and McCrae, 1925). Such a happening is usually the result of accident—the patient sitting too near the lamp, or not sitting normally to the incident rays. A new lamp gives off a very high intensity during the first few hours of its burning life and may cause a burn, or the susceptibility of a patient on returning after a lapse in the treatment may not be properly assessed: a ten days' interval usually necessitates commencing at half the last exposure, a three weeks' interval means starting again with the initial dose. The discomfort is considerably eased by the liberal use of calamine lotion where the erythema is general; in the case of a local burn zinc oxide ointment or a hamamelis compress will be found useful, and blisters may be treated with a 0.5 per cent. solution of resorcin.

Memories of the unfortunate sequelae of X-ray dermatitis have led to the expression of the fear that prolonged ultra-violet radiation might possibly lead to the development of carcinoma; Lenthal Cheatle (1925), for example, hinted at the possibility of such remote effects on finding active mitosis in the basal layers of radiated skin. It would seem, however, that this is due to the active stimulation of the new formation of the skin that occurs after desquamation (Rollier, 1925), and the experience of those who have used this form of radiation on thousands of cases for periods of well over twenty years without any such untoward

results seems to put the matter at rest (Finsen and Reyn at Copenhagen, Gauvain at Alton, Rollier at Leysin, and Sequeira at the London Hospital), the more so especially when the first three of them have been in the habit since the beginning of this century of treating lupus with strong exposures over prolonged periods, a circumstance which in the case of X-rays frequently leads to epithelioma (Sequeira).

The Eye.—During radiation goggles should always be worn, and it is essential that these be provided with side-pieces. Although ordinary glass is opaque to all but the longest ultra-violet waves, it does not give complete protection against intense exposures. A more opaque glass, such as Crookes', should, therefore, be used, and it should be as dark as is compatible with vision to avoid the fatigue and discomfort of the distressing glare. If this precaution is neglected the action of the light upon the cornea and conjunctiva produces an extremely painful photophthalmia (see Duke-Elder, 1926) after a latent period of four to eight hours; upon the retina it gives rise for some time to a central scotoma which is followed by a persistent feeling of uneasiness, irritability, and headache, while with regard to the lens there is the possibility of the development of cataract. Ultra-violet light, when used with enough intensity, produces cataract; and although little damage may seem to accrue from exposures of the intensities which are used clinically, unless protective precautions are taken by those who are frequently exposed to them, there is a danger of ultra-violet light cataract having the same unfortunate associations as X-ray dermatitis. Small subliminal exposures repeated at frequent intervals over a long period give rise to a chronic low-grade conjunctivitis of the follicular type, the eyes appearing constantly suffused and bleary, and the lids red and irritable. It is frequently seen in those conducting ultra-violet light clinics—and also in the habitués of cinema studios—when adequate protection to the eyes is not conscientiously worn. (For its experimental production, see Birch-Hirschfeld, 1909.)

Cases treated

The series of 425 cases dealt with comprises 306 treated by general light-baths alone, and 119 treated, some entirely by local phototherapy, and some by a combination of the two methods. They run in chronological order as they appeared at the clinic without reference to the nature of the results obtained; for the limitations of the method of treatment are as important and interesting as its successes. They include the period up to July, 1927.

The cases treated by general phototherapy upon which this paper is based are these:

	Cases.
Iritis and irido-cyclitis	102
Choroiditis	16
Sympathetic ophthalmitis	1
Retro-bulbar neuritis	3
Vitreous haemorrhages	2
Scleritis	4
Sclero-keratitis	9
Tuberculous keratitis	2
Phlyctenular keratitis	104
Interstitial keratitis	10
Recurrent corneal ulcers	23
Acne (corneal)	1
Corneal opacities	6
Blepharo-conjunctivitis	19
Recurrent hordeola	2
Tuberculous dacryocystitis	2
	306

Iritis and Irido-cyclitis

The cases of iritis will be considered in two sections:

	Cases.
Iritis and irido-cyclitis of infective or unknown origin	76
Iritis and irido-cyclitis of tuberculous or presumably tuberculous origin	26
	102

Infective Iritis and Irido-cyclitis.—It can safely be said that on the whole ultra-violet radiation is an extremely valuable adjunct in the treatment of the great majority of the cases of iritis and irido-cyclitis. Local treatment by atropine, heat, etc., should, of course, be persisted in, infective foci should be dealt with, and the condition of the patient attended to in every possible way. As a general rule mild cases of acute iritis have not been dealt with; with severe acute cases the response has been very marked; but inasmuch as rapid improvement in such cases after the institution of the ordinary methods of treatment is the rule, and the effect of radiation is therefore difficult to assess, it is the chronic and intractable cases, which have been treated without success for periods of months or even years by all the known methods of therapy (vaccines, milk injections, arsenic, etc.), which have demonstrated most clearly the value of the method.

The first result of treatment is usually a relief from pain, which frequently makes itself apparent after the first few exposures. Later the injection and the angry appearance die down, and in the progress of a typical chronic case the eye has become white towards the latter part of the first course of six weeks. Coincidently, keratic precipitates tend to disappear, pupillary adhesions stretch and give way, and about the third to the fifth week a vitreous haze tends to clear up, sometimes very rapidly, sometimes slowly. Meantime vision is improving, and the patient is experiencing the general tonic effect of the treatment, is eating and sleeping better, is putting on weight, and is feeling mentally and physically invigorated. As a rule in the more chronic cases after such a course a holiday of two to four weeks is given during which time improvement tends to go on, sometimes even more quickly, at any rate initially, than during the course; and it is unquestionably the case that the second course, when it is inaugurated, acts much more quickly than the first. It is not uncommon at the commencement of the latter for a patient to hang fire and show little improvement for some time, but at the commencement of the second course an immediate and rapid improvement is the rule.

There are one or two general tendencies which have become apparent in the experience of the clinic. It does not seem to matter what the type or source of infection is; lesions which seem definitely to be associated with dental infection or infected tonsils react on the whole irrespective of the type of bacterial flora found there, and in much the same manner as lesions whose aetiology has remained obscure. To this, however, there are two exceptions: the average response to tuberculosis is good (a point which will be dealt with later), and the almost invariable response to lesions associated with syphilis is bad. All cases do not react well, and progress does not seem to depend so much upon the nature of the eye condition as upon the general reaction of the patient to light; some few will not tolerate it at all, and others react unfavourably to any but small doses. For each individual there is a definite optimum dose which must be studied and varied with the changing immunity of the patient if the best is to be got out of the treatment; too large or ill-advised dosage is useless, and in those cases where a slow or delayed response has led to the adoption of doses beyond the limits prescribed, the result has invariably been deterioration of the eye condition and a set-back in the tonic general effect which the treatment should produce. It is probably the case that most of the failures reported in the literature are due to excessive dosage exceeding the patient's tolerance, or to the prosecution of treatment in the case of patients who are intolerant altogether. On the average in cases of iritis, if any good at all is to come out of radiational treatment, the fact is obvious at or

before the end of the first course, and if no improvement at all is then apparent, the method in the great majority of cases might as well be discontinued. A slight improvement, however, is significant, and in many advanced cases treatment has had to be continued over many months before the eye is in a satisfactory condition, a process which demands considerable patience both on the part of the therapist and the patient. This, the arrest and slow amelioration of a progressive irido-cyclitis is, however, one of the most satisfactory aspects of phototherapy in ophthalmology, for in too many of these little can be done by the ordinary methods of treatment at our disposal.

There are cases which respond initially to treatment, and then tend to fall back; and there is a certain percentage which hold their own or tend to improve under treatment, and then relapse after its cessation. Most of these are rapidly improved on a renewal of the treatment, but in all cases it is a good thing to continue treatment for some time after the eye seems settled, and in those cases which show a relapsing tendency, to give one or two short courses at intervals for some time afterwards. Finally, it is to be remembered that a large number of the cases referred to the clinic were in a very advanced and almost hopeless condition; the improvement in a few of these has been surprising, but miracles have been as remarkably few; while an eye which has shown active inflammation for many months may well become quiet, gross structural changes with their consequent loss of visual acuity are as unalterable under the ultra-violet light as under any other method of therapy.

The results of treatment may be summarized thus:

Infective Irido-cyclitis

Result.	No. of Cases.	Percentage.
1. Improved	68	90
(*a*) Cured	38	50
(*b*) Much improved	15	20
(*c*) Eye quiet, but with structural changes precluding improvement in vision	10	13
(*d*) Temporary improvement relapsing later	5	7
2. Not improved		
(*a*) No observable change ...	4	5
(*b*) Got worse under treatment	4	5

Illustrative examples may be cited.

Male, aged 42 years. Gonorrhoeal infection 1916 with iritis, several mild relapses with two severe ones in 1918 and 1923 in the right eye. Vision 6/24 owing to vitreous

opacities, which had persisted since 1918 in spite of all treatment. Acute relapse with much k.p., 1926. One course of 20 light treatments: after the tenth, eye quiet; after the fifteenth, vitreous haze much clearer, and k.p. away; at the end of the course, R.V. 6/5, and remained so eight months later.

Female, aged 29 years. R. and L. irido-cyclitis, aetiology unknown. History of two previous attacks three and two years previously, since which time progressive visual deterioration. Cornea oedematous, aqueous turbid, posterior synechiae and pigment on anterior lens capsule, vitreous haze. R.V. 6/60, L.V. 6/24. Atropine, hyoscine, duboisine irritation. One course of twenty light treatments: eye quiet, media clear, R.V. 6/6, L.V. 6/5.

Female, aged 33 years. Acute irido-cyclitis, R. of unkonwn aetiology; L. normal. Oedematous cornea, turbid aqueous, k.p., vitreous haze, R.V.=counts fingers. Atropine irritation. Twenty light treatments: eye quiet, no k.p., R.V. 6/9.

Female, aged 42 years. Rheumatoid arthritis 13 years (colon infection, cystitis). Iritis R. and L. 10 years, with recurrent attacks several times per year varying with the intensity of the arthritis. This was progressive, and responded to no treatment except travelling abroad, everything from autogenous vaccines to sea-water injections having been exhaustively tried. Eyes both injected, irides tied down in ring synechiae, k.p. profuse, left lens opaque, abundant vitreous opacities right, tension slightly subnormal. R.V. hand movements, L.V. fingers at 3 feet. In May, 1926, commenced treatment. After the first ten exposures, the eyes became painless and whiter and the pain from the arthritis became less. The condition gradually improved. After four courses (80 treatments) the right pupil dilated and the vitreous cleared largely, the vision becoming 6/9 with glasses (−3.0 sph. −3.5 cyl.); the left eye remained with adherent iris, an opaque lens, and good tension. Since then up to May, 1927, the eyes remained unaltered, excepting slight attacks of injection accompanying a mild attack of arthritis, which were readily controlled by light. A short prophylactic course was taken every two or three months in the meantime. Since May, 1927, relapses ceased, and without any further treatment the eyes have remained in the same satisfactory condition.

Female, aged 30 years. Both eyes "bad" since aged 2 years: irido-cyclitis with sclero-keratitis and corneal opacities. Bilateral iridectomy 1919. Since 1924, eyes "have never been quiet for longer than six weeks." R.V. perception of light, L.V. hand movements, the deficient perception being apparently due to corneal opacities. Eighty light treatments between March and August, 1927. After the first fifteen: eyes quiet, and have remained so since; R.V. perception of light, L.V. 6/60.

Of the four cases which showed no improvement, one was a very advanced irido-cyclitis (presumably of dental origin) with a very low tension, two had a positive Wassermann, and one appeared to react generally badly to light. Of the four which got worse during treatment, two were syphilitics, and two were intolerant to light. In the first of these last, one improved initially, and then fell back during treatment; at the end of the first course deterioration was more rapid; during a second and third course the eye condition barely held its own, remaining irritable; thereafter the patient discontinued treatment. The second had a typically bad reaction to light. At the end of the first six treatments a hypopyon appeared; a fortnight's rest was given and treatment started very carefully with small doses again, when a similar occurrence took place; whereupon treatment was stopped. The disease appeared to be due to dental infection.

Tuberculous Irido-cyclitis

The results obtained in the treatment of tuberculous irido-cyclitis are in every way comparable to those already described in the cases due to infective organisms, except that, on the whole, making due allowance for the severity of the cases, they are more satisfactory. This is the more important since tuberculous irido-cyclitis is notoriously one of the most difficult diseases to treat in the whole of ophthalmology. In the early cases the improvement has frequently been surprisingly rapid; pain has disappeared,

injection has died down, iritic nodules have gone, and massive keratic deposits have faded away towards the end of the first or during the second course of radiation. On the other hand, the cases dealt with have included a large proportion which were very advanced, and some in which one eye had already been excised for a similar disease. In these the response has often been slow, but as a rule, when established, it has been maintained, although necessarily leaving, on occasion, an eye of little functional use. In these cases treatment is worth while persisting in for many months, and should be carried on for some time after the condition seems settled, for there is a tendency to relapse. In the series of twenty-six cases all have improved, and have retained or improved upon the standard of vision which they had at the commencement of treatment, with two exceptions, which, after considerable improvement at first, have relapsed later, one in the absence of further treatment, the other in spite of it. Incidentally it is to be noted that both of these were pronounced hopeless before they were referred to the clinic. On the whole the results leave no doubt that ultra-violet light is the treatment of choice for this condition.

Female, aged 24 years. Right tuberculous irido-cyclitis. Ciliary injection, nodules on iris, much k.p., posterior synechiae, vitreous opacities, staphylomatous sclera: eight months duration. R.V. 3/60. After thirteen treatments, pain away, eye white; after three courses (80 treatments), discharged under observation: R.V. 6/18.

Female, aged 24 years. Irido-cyclitis L., three years. Cyclitic injection, lower third of anterior chamber filled with exudate, nodules on iris, posterior cortical changes in lens, posterior two-thirds of vitreous filled with an organized inflammatory mass. After forty treatments, anterior chamber free, some pigmented k.p., remnants of nodules only on iris, lens and vitreous as before. Vision unchanged (bare p.l.); eye quiet.

Female, aged 38 years. Left excised for tuberculous irido-cyclitis three years ago. Right, injection and pain with k.p. and vitreous haze three months. Twenty treatments: eye appears normal; R.V. 6/5; a further course of 20 treatments, since which time the eye has remained quiet (18 months).

Choroiditis

Of the sixteen cases of choroiditis treated four were acute; these all settled down very rapidly; but although they were left with a clear vitreous, a clean scar in the fundus, and a good visual result, inasmuch as this is wont to happen in any case, it is in the cases of persistently recurring lesions that the results of ultra-violet radiation are best seen. The remaining twelve were of this nature; two of these were considered tuberculous, two syphilitic, the remaining infective in origin. The tuberculous cases both cleared up very satisfactorily, the syphilitic showed no improvement, and the eight infective cases after treatment varying from two to three courses remained quiet (the period of observation lasting from 18 to 3 months) with one obstinate exception, which, despite eighty

treatments, persistently recurred in the intervals between courses, on each occasion with a further deterioration of vision. On the whole, therefore, the results are satisfactory, one of the most notable features being the rapidity with which a vitreous haze, sometimes of considerable standing, may clear up in the course of two or three weeks.

The one case of *Sympathetic Ophthalmitis* had a quiet eye without k.p. after six weeks' treatment; he had, however, arsenical treatment in addition.

The three cases of *Retro-bulbar Neuritis* (one of which was associated with ethmoidal suppuration, two of which were of doubtful aetiology) all cleared up with a good visual result, two after one course of treatment, the third, which had a relapse soon after the cessation of treatment, after a second course.

In the two cases of *Vitreous Haemorrhage* clearing had become quite apparent in three weeks; they were both of the type showing a uniform and fine haze. In the first (a spontaneous case) full visual acuity was regained in six weeks, in the second (a traumatic case) the clearing media revealed an extensively detached retina.

Scleritis and Sclero-keratitis

Thirteen cases of scleritis and sclero-keratitis were treated by general light-baths. In four of these the lesion did not involve the cornea; of these two were considered to be tuberculous, and two of infective origin. In all the disease subsided.

Female, aged 24 years. Scleritis right, with iritis and k.p., which had resisted ordinary treatment for three months. R.V. 6/12. After three treatments, eye painless; after the eighth, the injection had disappeared. The course of twenty treatments completed, when R.V. 6/9. Three weeks later, relapse with eye again painful and injected. After second course (20 treatments), eye white; R.V. 6/6, partly; condition unaltered six months later.

In the remaining nine cases the disease involved the cornea also, and was accompanied by a varying amount of iritis. They were all of considerable standing; five were accepted as tuberculous, in that the von Pirquet was positive and other sources of infection were excluded, and four were considered infective. Under prolonged treatment they all eventually quietened down with the exception of one who left soon after the commencement of his course. The usual result was a quiet eye, free from injection and pain, with, however, no improvement in the corneal opacities. It was found that considerably better and more rapid results could be obtained by combining general radiation with the local application of light to the cornea; this subject will therefore be discussed further in a subsequent paper.

Two cases of *tuberculous keratitis* were also treated, each involving a considerable corneal opacity with active ulceration and

ciliary injection. Although both eventually cleared up leaving a quiet eye with a large corneal opacity, the treatment of election for these also is a combination of local with general radiation.

Phlyctenular Keratitis

No disease responds better or more quickly to ultra-violet light than phlyctenular kerato-conjunctivitis. Especially does this apply to children, and the typical phlyctenular child, ill-looking, fretful, irritable, and distressed with photophobia, is frequently transformed into a different being in a week or two. The series of 104 patients dealt with embraces all manner of cases, from a first acute attack in a child to those extremely chronic cases which go on with intermissions for ten, fifteen, or twenty years, leaving an opaque cornea constantly breaking down, and an eye, to all intents and purposes, useless. Throughout, the results of treatment were good, and light may be considered almost a specific for this disease.

The average acute case shows an excellent response; pain and photophobia may disappear in the course of the first week, after (say) the third or even the second treatment, and as a rule at the end of three weeks the child is a changed individual. Experience has shown, however, that a full course of treatment should be given, and if possible, a second to prevent the liability to relapses; indeed in this class of children the ideal procedure is undoubtedly to give them a prophylactic course of artificial light once or twice a year, especially in the sunless months of winter. In the more chronic cases the response is slower, but here again it is good. In some of these, where there is much chronic corneal activity, local applications of light are of very considerable benefit.

Female, aged 12 years. Ulcers in each eye eight years, during which time she had been an in-patient in hospital three times, and had been sent to a convalescent home twice. Both corneae had ulcers carbolized on different occasions. Acute recurrent attacks every few months, with constant injection and irritability in the intervals. R. and L.V. hand movements. After one course (20 treatments), eyes quiet, with vascularized nebulae showing no activity; after the third course, R.V. 6/60, L.V. 6/36. Eyes still quiet nine months later.

The records of the large majority of cases are of rapid recovery: an example of the more resistant type is as follows: Female, 5. Three months duration, ulcers on each eye with blepharo-conjunctivitis. Six treatments: eye improved, photophobia away. After twelve treatments, eye white, blepharitis still present. Three weeks after cessation of course, a relapse occurred. A second course of twelve treatments: eye white. One month later, a further relapse. Ten further treatments: eye white again. Six months later, eye still quiet, with faint corneal nebulae.

Interstitial Keratitis

The experience over a series of ten cases, which were given a trial treatment extending over many weeks, was that, apart from the tonic effect on the health generally, ultra-violet light was of no benefit.

Recurrent Corneal Ulcers

Twenty-three cases of recurrent corneal ulceration were treated by general light-baths. It appeared that the treatment aided the usual methods of therapy to such an extent as to allow the cornea to heal up in the majority of these, especially in marginal ulcers associated with a conjunctivitis; but since the response of such cases to local irradiation of the ulcer was found to be extraordinarily good, treatment by general baths alone has been largely given up. For a similar reason, the treatment of *acne* by general baths has been augmented by local phototherapy.

Corneal Opacities

On the instigation of claims in the literature, six cases of well-marked corneal opacity from various causes were given an extensive trial of treatment by general light-baths; in none was any evidence of improvement seen.

Blepharo-conjunctivitis

The type of conjunctivitis and blepharitis which occurs in debilitated patients, typically in children, say after some illness, as measles, is immensely benefited by ultra-violet light. In many of these, where the disease has resisted other methods of treatment for many months, radiation seems to have the same remarkably good effect as is seen in phlyctenular conjunctivitis.

Male, aged 6 years. Blepharo-conjunctivitis for nine months, no obvious cause; general health seemed below the average. Treatment by local lotions, ointments, and protargol with general tonics of no avail. After six light treatments, lids and conjunctivae normal. Discharged cured after twenty treatments.

Female, aged 17 years. Blepharo-conjunctivitis for three months resisting all treatment, which had appeared since coming from the country to work in a city office. Was completely cured by one course (20 treatments) of light-baths.

A second type of conjunctivitis which reacts well to general light treatment is the inflammation which tends to occur seasonally with coryza and hay-fever in its various manifestations. Many cases of hay-fever seem to be a manifestation of an abnormal sensitivity to some protein substance, and in a number of these ultra-violet light acts as a specific. The action may have something to do with the absorption from the radiated cells of the epidermis of the photochemical products of proteins, which, when they are absorbed, influence the general immunity reaction of the body. However that may be, remarkably good results were obtained in the three cases of this type which were treated.

In a series of six cases of ordinary chronic conjunctivitis occurring in obviously healthy adults general ultra-violet treatment was given a fair trial; in these no marked effect was evident.

The subject of conjunctivitis will be considered again in the report of the results of local radiation.

Recurrent Hordeola

Two cases of persistently recurring styes in debilitated children seemed to be rapidly cured by light treatment. Here again light appeared to act as a powerful tonic and germicidal agent, which enabled the patient to master an infection which could not be overcome with his unaided powers of resistance.

Tuberculous Dacryocystitis

Two cases of tuberculous dacryocystitis were treated, both of which cleared up completely after a protracted and persistent but unsuccessful attempt by the ordinary methods.

Female, aged 24 years. Phthisis R. lung in youth. Conjunctival nodules in 1921; excised; recurred; sent to Rollier (Leysin) under whose treatment (sun-baths) they cleared up. In 1925 nasal discharge: R. and L. sacs excised (tuberculous). An open discharging sinus persisted in spite of all treatment (scraping, etc.) until Feb., 1926. General light-baths started, and discharge ceased and sinuses closed in four weeks.

General Conclusions

Much that has been written about ultra-violet light is merely fantastic. With judicious use its effects can be powerful for good, but they have their limitations and they always stop short of the marvellous. It is not a cure-all: nothing is, or is likely to be. And at all times to get the best out of the method, it has to be used with considerable care and only after experience; its haphazard application in ill-considered dosage is almost certain to lead, at the least, to the opposite of the desired effect.

Neglecting the value of local light treatment, which will be discussed in the subsequent paper, it would seem that a fair assessment of the results of the treatment of ocular diseases by general radiation with ultra-violet light, in as far as they are shown by the experience at the clinic at Moorfields, is that the method is an adjunct of considerable value to the ordinary routine therapeutic measures. Particularly is this so in tuberculous diseases of all kinds: to these, as a rule so intractable and obstinate, it offers, within limits, a large measure of hope. In phlyctenular disease also it is undoubtedly the treatment of choice. In infective diseases involving any of the structures of the eye, with its general tonic effect, its psychological and physical stimulation, its reorganization of endocrine activity, and, above all, its marked influence on the immunological response of the body, it is able to exert a powerful influence. While its judicious employment in acute cases frequently leads to striking results, perhaps its greatest use is to be found in the treatment of

chronic infections which appear to resist all forms of treatment; in many of these it has been found to be the deciding factor in tipping the balance over to the side of recovery. There is much to be said for the old Italian proverb: "To bathe in water is good, in air better, but in sun-light best of all."

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AN INDELIBLE "3-OBJECT" COMPARATIVE TEST FOR CENTRAL COLOUR SCOTOMA—ALSO IN CASES OF CONGENITAL COLOUR ABNORMALITIES

BY

S. HOLTH

OSLO

SINCE 1905 I have published several articles in the Norwegian, French, and German languages (Lit. 1, 2, 3, 4, 6, and 7) on a rapid and extremely sensitive comparative method for the detection of central or paracentral colour scotoma, due to axial intoxication of, or axial inflammation in, the optic nerve.

In the discussion on Perimetric Methods at Oxford, 1920, I demonstrated the 1914 model of my chord perimeter, with the "3-Objects" as celluloid discs on the outside of the two rules (*Brit. Jl. of Ophthal.*, Vol. IV, pp. 470-473, 1920); but otherwise I have not published anything in English on the "3-Object" Test.

The following year I introduced Engelking and Eckstein's Colour Cartoons (Lit. 5) for my "3-Object" Test (Lit. 6); these

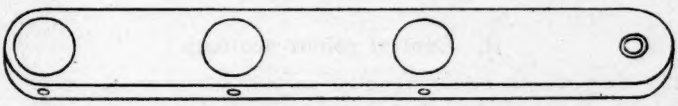

FIG. 1.

Dr. Holth's indelible "3-Object" Comparative Test for Central Colour Scotoma. (Reduced in size to 2/3.)

colours are very good when new, but are liable to fade in light, and should then, and when soiled, be renewed with discs from the original cartoons.

I have therefore since the early spring of 1924 (Lit. 7) reverted to celluloid discs for the larger objects (red and pink) and to my first material, melted and ground sealing wax for the small objects (yellow and light blue); none of these objects fade in light and when soiled they can be cleaned in a moment with soap and water.

The instrument (Fig. 1) consists of a black ebonite rule, 16 cm. long, 2 cm. broad and 5.5 mm. thick; a round hole near one end allows the instrument to be hung on a small nail in the wall near the patient's head. Or the instrument may be laid among the accessories of the trial case.

On each of the four sides of the rule there are bored three round holes, each 1 mm. deep; the three holes have a mutual distance of 4 centimetres. On one of the broad sides there is inlaid in

each of the 15 mm. holes a *bright red* celluloid disc; on the other side there is inlaid a *pink* celluloid disc in each of the 10 mm. holes. The two narrow sides have three holes of 3 mm. in diameter, which are filled with melted sealing-wax which is ground after complete coagulation. On one side the three holes are filled with *light blue* sealing-wax (Denisson No. 252 "light azure blue"); on the other side the three holes are filled with *pure yellow* (Denisson No. 261 "canary").

I now use the "3-Object" Test in the following manner:

The patient sits with his back to the window or a "daylight" electric light; the eye not under examination is covered. The rule is held horizontally 1.5 ft. (formerly 1 ft.) from the examined eye, with the upper edge of its surface inclined a little forward, in order to eliminate every trace of reflexes from the surfaces of the three objects. The patient gazes at the central object.

A. No central colour scotoma

All three objects of each of the four surfaces have the same colour, whether the congenital colour sense is normal or not.

The only exception is the *amblyopia* of a *squinting eye*; here very often the central object (Fig. 2*a*) is seen discoloured, or is not seen at all when vision is less than 1/50.

B. Central colour scotoma

(*a*) *In patients with congenital normal colour sense.*

Vision=5/6 to 5/10: In all cases the nasal, and in many cases also the central object, is seen in the right colour; but the temporal one is seen faded (Fig. 2*b*), which also may be the case with the central object (bright red=light red; pink=paler rose). Repeat questions with the rule turned 180°.

Vision=5/15 to 5/50: The nasal object is still seen in the right colour, the central and the temporal discoloured (temporal bright red is often named "brown" and pink often "grey" (Fig. 2*c*).

Vision under 5/50: all three objects are discoloured, the nasal less. Vision=2/50 to 1/50: the temporal object may be completely invisible and the central object nearly so.

When the rule is held vertically (Fig. 3) the superior and inferior objects are generally normal, the central object is seen discoloured, not only in the rare cases where the scotoma is absolutely central without the least excentricity as in Fig. 2*a*, but also as in Fig. 2*c*; in cases as Fig. 2*b* the central object may be seen paler than the two other objects—but here as in most cases the horizontal position of the rule is better.

(*b*) *In patients with congenital abnormalities of the colour sense.*

Here also the bright red and the pink objects should be used; but *do not demand the names of the colours* (congenital colour abnormals may, without central colour scotoma, tell you that "pink" is "green," but more frequently "bluish" or "grey").

FIG. 2.

Recording central and paracentral colour scotomata for the right eye in the diary while the "3-Object" Test is held *horizontally*:

a. Absolutely central scotoma, without any trace of excentricity (rarely seen in axial neuritis retrobulbaris but often in *amblyopia* of a *squinting eye*.

b. Pure excentric colour scotoma (V = 5/6 to 5/10.)

c. Ordinary central and excentric colour scotoma (V = 5/15 to 5/50.)

FIG. 3.

Recording central colour scotoma while the "3-Object" test is held *vertically*; such will be the result both for Fig. 2*a* and Fig. 2*c*—sometimes also for Fig. 2*b* the central object is paler than the two excentric objects.

Ask them: "which disc is the brightest?" Answer: the nasal one (R.E.: "the left one"; L.E.: "the right one"). Then try them with the three small "pure yellow" and "light blue" objects, held horizontally at 1 ft. (30 cm.) distance. Ask: "which colour is darkest? or dullest?" Answer: the temporal one (R.E.: "the right disc"; L.E.: "the left disc"). Then ask: "which colour is brightest?" Answer: the nasal one, whose name, when vision is 5/50 or better, is generally correctly named "yellow" or "blue."

For investigation of irregular central scotomata of different size, due to ophthalmoscopic visible conditions (*e.g.*, chorioretinitis centralis, vascular lesions, haemorrhage, traumatic hole at the macula) the "3-Object" Test is *not* intended; in these cases a stereoscopic examination of the central visual field with very small white objects is the correct method (Dr. E. Haitz's Stereoscopic Cartoons from J. F. Bergmann, Munich).

The "3-Object" Test, as mentioned, is only designed for central and paracentral, *colour scotoma* due to *retrobulbar affections* of the *optic nerve*, caused by intoxication, inflammation, or finally atrophy in the *axial bundles* of the nerve without visible ophthalmoscopic alterations—at most the temporal part of the disc (in case of axial atrophy) may be paler than normal. This applies, *e.g.*, to intoxications with tobacco, alcohol or lead, diabetic autointoxications and to multiple sclerosis. There are cases of tumour in the hypophysis cerebri with bitemporal paracentral scotomata as in Fig. 2*b*—the least suspicion of this requires complete and exact examination of both visual fields; the same may be necessary in multiple sclerosis. In most cases of tobacco amblyopia a rapid examination of the limits of white and colours in the horizontal meridian only may be sufficient.

For the diagnosis of *incipient tobacco amblyopia* with vision still good enough for reading (V.=5/6 to 5/10) the "3-Object" Test is very sensitive (Fig. 2*b*); after sufficient abstinence from tobacco the vision may rise to 5/4 in such cases. I have also seen this occur in partial obscurations of the lens, where *tobacco intoxication* and *not* this *incipient cataract* was the *cause* of the *sunken visual acuity*.

When in spite of completely transparent media, normal fundus and exact correction of any error of refraction the vision remains relatively low, a rapid examination with the "3-Object" Test may reveal a central colour scotoma.

As assistant at the University Eye Clinic in Oslo, 1899-1905, I repeatedly found with my "3-Object" Test *central colour scotoma* in *sympathetic uveitis*, both in the injured and in the sympathizing eye (Lit. 1); but I also saw cases of sympathetic uveitis without any trace of central colour scotoma. On the other hand I found some central colour scotoma also in *ordinary chronic irido-cyclitis* (Lit. 2 and 3); I first thought that these scotomata were due to a secondary retrobulbar neuritis optici, which may be so in some cases, as once demonstrated microscopically by Professor J. Meller in Vienna about ten years ago. But I thought later (Lit. 2, p. 174), that most cases were due to an intoxication of the optic nerve from resorption of intra-ocular inflammatory toxins; I named the condition "amblyopie irido-cyclitique" (Lit. 3, p. 308). I am glad to see that Mr. J. Gray Clegg (Lit. 8 and 9) has seen a series of

cases of central colour scotoma in anterior uveitis, and that he concurs in my opinion as to the rôle of the intra-ocular inflammatory toxins.

The instrument is made by Theodore Hamblin, Ltd., Dispensing Opticians, 15, Wigmore Street, Cavendish Square, London, W.1.

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MASSIVE RETINAL HAEMORRHAGE

BY

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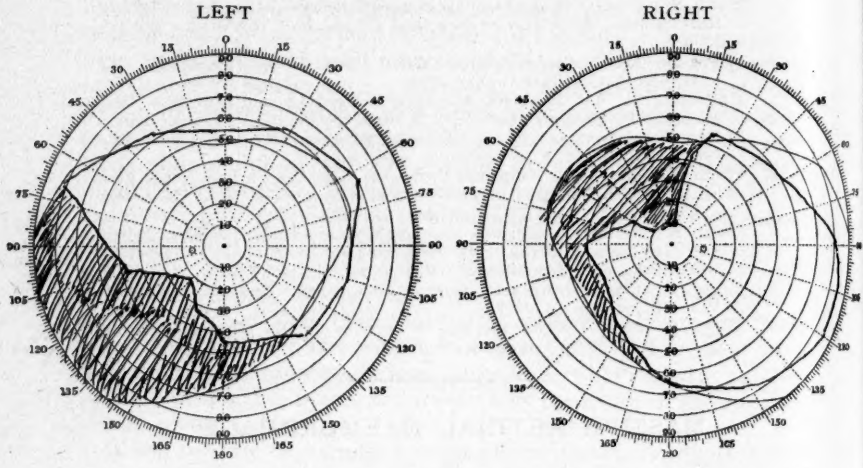
LONDON

THE publication of an abstract in *Brit. Jl. of Ophthal.*, Vol. XI, p. 573, of a paper by A. Fuchs on "Rare Syphilitic Affections of the Eye," especially the third section entitled neuritis papulosa, has recalled to my mind two similar cases which have been under my care during the last eleven years. My cases differed from those described by Fuchs in being bilateral, whereas his are stated to have been unilateral; but, judging from the report, there is a large measure of similarity between them.

Case I

A man, aged 25 years, was referred to me from the V.D. department of St. George's Hospital in October, 1922, on account of defective vision of about five months' duration. He was wearing glasses of −0.75D. spherical strength.

The eyes were free from inflammatory injection, precipitates were noted on the back of the right cornea, the pupils reacted to light, and the tension was normal. His vision was very defective, amounting to <6/60 in the right eye and 6/60 in the left with correction. The pupils were dilated with homatropine; in the right eye the vitreous was found to be turbid with gross floating opacities, and no clear view of the fundus could be obtained; as far as could be seen no obvious lesion of the fundus was present. The left vitreous was much clearer and it was easy to see that a very peculiar picture was present. In this eye the disc was entirely



hidden by a large roughly quadrilateral mass of white exudate, at the upper edge of which were massive retinal haemorrhages. The mass came well forwards into the vitreous, and from under its lower edge the main inferior branch of the retinal vein appeared and ran in a tortuous manner towards the periphery. It was dilated to about double the usual breadth and looked like a broad flat ribbon. No other gross lesion was to be seen in the fundus at this time. The fields showed marked semi-quadrantic contractions.

The question propounded to me was whether treatment by the newer arsenical preparations should be persisted in or not. I gave my opinion that the case should be treated on the old-fashioned lines with mercury and iodide. The man was accordingly admitted under the care of Dr. Fox, and was later transferred to the Eye wards under my care. On leaving the hospital he was kept under treatment in the V.D. department and I saw him at regular intervals. A steady improvement occurred in the left eye and the

vision in the right began to improve also. Thus on November 11, 1922, R.V., 6/36; L.V., 6/18. I saw him on December, 30, 1922; he complained that the right eye had become very much worse a week earlier, and I noted that massive haemorrhages were present in the fundus. At this time the vision in the left eye was 6/12 and the appearances shown in the drawing were beginning to be seen. The pictures were painted by Mr. Head in March, 1923. The left fundus showed a large area of choroidal disturbance upwards with a fold of organized retinitis proliferans running up to it along a branch of the superior retinal vein, which came forwards into the vitreous. In the right eye the disc was obscured by massive haemorrhage and the upper vessels were replaced by a cord-like structure which came forwards into the vitreous to a considerable extent; yet there was no retinal detachment of the ordinary type to be seen. The upper end of the cord-like structure bifurcated in a most odd manner. On June 9, 1923, his vision was noted to be 6/36 in the right eye and part of 6/9 in the left with his correction. At this date he informed me that he had obtained work at some distance from the hospital and that he would not be able to come and see me unless any deterioration in his vision took place. I am under the impression that he continued to attend the V.D. department for some months and then ceased attendance. I wrote to him in September, 1927, to ask him to attend for a further fundus drawing. He answered that he would come; that his left sight had kept quite good and that that of the right eye varied, occasionally it seemed a bit better and at other times worse. On September 15, 1927, his vision was found to be $<6/60$ in the right eye and most of the letters of 6/6 in the left. The condition of the left fundus was unchanged; that of the right is shown in the drawing by Hamblin, reproduced here; an extensive area of old choroidal change is to be seen below the disc, while a gross mass of organized exudate springs forwards from the outer border of the disc into the vitreous; one band appears to contain the main superior vessels and the fork is still evident; by moving the head a marked parallactic displacement is seen to occur between the two branches of the fork.

Unfortunately for the purpose of this record, the full notes of this case which I made at the time have been mislaid, and I cannot find them. I am therefore unable to give the measurements of the swellings in the vitreous, but my impression is that the cord-like prominence in the right eye was seen with +8.0D. sph.; and the exudate in the left with +5.0D. sph.

Full records of the general treatment of this case are preserved in the books of the V.D. department of the hospital. His first attendance was in June, 1922, and a history of infection in the previous February was noted. Prior to coming to London he had

CASE I. Right Eye. March, 1923.

CASE I. Left Eye. March, 1923.

had treatment in Dublin, four injections of N.A.B. having been given. The Wassermann reaction on arrival at St. George's was positive, and he had secondary eruptions on the body. In September, 1922, the Wassermann reaction was negative; arsenical preparations seem to have been given throughout and the Wassermann reaction was again positive in 1923 and 1924; by February,

CASE I. Right Eye. September, 1927.

1925, he had already had four courses of arsenical preparations; in September of the same year the Wassermann reaction was negative and it has kept negative since that date. His last attendance in the V.D. department was January 31, 1927. I find from the notes that an injection of neosil 0.3 grm. was given on December 15, 1922, the right eye failed a week later so probably this was a coincidence and not directly due to the drug.

Case II

I do not think it quite correct to include this case under the syphilitic heading as the Wassermann reaction was done twice, each time with a negative result; but the clinical course was so similar to that of the first case that I think it justifiable to include a description of the case in this paper.

Miss —, a poor-law infirmary nurse, was brought to see me in private by her sister in July, 1916. Her age was 22 years and there was a history of failure of vision in the right eye of a month's duration, together with headache. Both eyes had been inflamed nine years previously. The eyes were free from signs of active inflammation; the pupils acted to light, though a few old posterior synechiae were present in each pupillary area; tension was normal. The teeth were suggestive of congenital syphilis, of the peg-top variety, without being notched. Vision in the right eye was $<6/60$, and in the left, part of 6/6. The right pupil dilated into an irregular oval, a large web of opacity was seen in the vitreous and the reflex was very poor, no details of the fundus could be seen.

By the end of the month a fair reflex could be obtained from the periphery, projection of light was good, and the centre of the vitreous was still very opaque. On September 5, I noted that details of the fundus could be seen in the outer periphery with +12.0D. sph.; some haemorrhage was present at this part of the retina, and as the projection in the nasal field was bad I queried the presence of a retinal detachment in the outer part of the fundus. She was admitted to St. George's Hospital on September 11. A careful clinical examination revealed nothing much amiss. The Wassermann reaction was negative. I am indebted to Dr. E. L. Hunt, Bacteriologist to St. George's Hospital for the following report on the quantitative von Pirquet test which was performed by him on September 18, 1916. Examined 46 hours after making the test, the 1 in 10 human O.T. showed positive results, *i.e.*, redness and swelling, but no areola. The test was negative to undiluted P.T.O. (bovine tuberculosis). It was also negative to human old tuberculin in strengths of 1 in 100, 1 in 500, 1 in 1,000, and 1 in 10,000. The control was also negative. The urine was normal. There were no signs of anything wrong in the chest or abdomen. The blood-count was as follows: Red cells, 4,325,000. White, 14,000. Hb., 98 per cent. Colour index, 1.16. A differential count gave the following percentages: polymorphonuclear, 72 per cent.; lymphocytes, 18 per cent.; mononuclears, 8 per cent.; eosinophiles, 2 per cent.

In the first instance she was treated with hot-air baths, subconjunctival saline injections, and potassium iodide; but as no progress was made a course of tuberculin was started, for I thought it most probable that she was a case of recurrent haemorrhage of adolescents which is so often of a tuberculous nature. About September 14 a large buff-coloured elevation appeared in the lower periphery of the left eye accompanied by a star-shaped figure at the macula. Tuberculin treatment was begun on October 11, 1916, and was continued until June 28, 1917. In March, 1917, the

right eye suddenly cleared up in a flash and she was discharged with R.V., 6/6; L.V., part of 6/18. At this time the right vitreous was almost free from floaters, the left vitreous was clear, the star figure was still present at the macula, but was less marked, and the buff-coloured elevation was less obvious. She was readmitted on April 16, 1917, with large retinal haemorrhages in the left eye; the condition of the fundus gradually improved and she went home on July 3. She was readmitted in October with a relapse in the left eye and was at last discharged with vision of 6/12 in the left eye on March 25, 1918. On October 11, 1918, R.V., +1.0D. sph., +0.5D. cyl. 70°=6/5; L.V., +1.0D. sph.=6/36. The left vitreous was still very cloudy and some choroidal disturbance was noted in the periphery of the left eye. In March, 1924, R.V., 6/9, +0.5D. cyl. 90°, 6/6; L.V., +0.75D. cyl. 180° 6/9 part; and J.1 binocularly at the ordinary reading distance. Gross floaters were present in each eye, fine white linear streaks were to be seen in the periphery of the right fundus and gross white plaques of organized exudation or haemorrhage were present in the periphery of the left, obscuring the vessels and projecting forwards into the vitreous. I have not seen her since but I saw her sister who first brought her to me last year and she told me that she was very well and had recently been married.

I ought to state that no other signs of congenital syphilis were noted in this case, there was no deafness and the corneae were clear. It should be noted that in the first case the retinitis proliferans is marked about the nerve-head, while in the second it is confined to the periphery.

These cases should be compared with the account of a case by Clapp, published in the *Brit. Jl. of Ophthal.*, Vol. X, p. 435, of new-formed vessels in the vitreous of specific origin. Clapp expressed the opinion in his paper that the arsenical preparations are not those of choice in these cases, as intra-ocular haemorrhages were made worse thereby; in his case improvement seemed much more rapid under treatment with mercury and iodide. Although I have no proof that the arsenical preparations had any deleterious effect on the first of my two cases, I should still be inclined, if any similar case were to present itself to me, to recommend the older fashioned treatment.

OPTICO-CILIARY VEINS ON THE PAPILLA

BY

T. HARRISON BUTLER

BIRMINGHAM

A MAN, aged 23 years, consulted me about the sight of his right eye. This with a suitable correction for astigmatism was found to be normal. Just above the macula there was a large patch of choroidal atrophy, the result probably of an intrauterine choroiditis. There was also a small "myopic" crescent.

The left eye showed a very unusual arrangement of the veins on the papilla which is shown in the accompanying sketch.

The disc is physiologically cupped and the main vessels arise excentrically from the nasal edge of the cup. From this site spring two large veins which run across the disc towards its temporal side where they end blindly, dipping down into the choroid. A faint trace can be followed just beyond the edge of the papilla, but almost immediately the vessel is lost to sight and presumably joins the choroidal circulation.

I cannot recollect seeing an anomaly of this kind before but doubtless such are recorded.

The acuity of the left eye was normal and the refraction hypermetropic to the extent of one dioptre.

A LAMP FOR OPHTHALMIC WORK

BY

T. R. AYNSLEY

CHESTERFIELD

THIS lamp will be found useful to oculists who have to work in schools, or see patients in rooms which are not fully fitted up for ophthalmic work. An ordinary living room or consulting room can quickly be adapted in this way.

The apparatus is simply a combination of the Tudor Thomas Screen (Messrs. Dixey and Son) and an "Adjusto-lite" (widely advertised for domestic purposes and sold by most electricians). There is a diaphragm in the Thomas Screen which can be altered to suit the varying requirements of refractionists. The room is quite dark except for a small amount of light which passes the

edge of the screen and is just sufficient to enable one to see the lens case and write notes. The screen can readily be swung to one side for oblique illumination of the eye, or to illuminate the test type; though personally I prefer to keep the patient sitting where the retinoscopy is done, and I have another Adjusto-lite clipped at the opposite side of the room beside the test card.

The Adjusto-lite has eight feet of flex and its base incorporates a strong felt-lined clip so that it can readily be fastened in any position and to most articles of furniture. The cost of the Adjusto-lite and Thomas Screen is two guineas and the whole outfit can be carried in the Adjusto-lite box in an attaché case.

ANNOTATIONS

Rebuilding of the Royal Westminster Ophthalmic Hospital

An important addition to the facilities for the study and practice of ophthalmology in London will be provided by the removal of the Royal Westminster Ophthalmic Hospital to a new and larger building in Broad Street, W.C.2, near the junction of Tottenham Court Road and New Oxford Street.

This hospital was founded in the year 1816 by Mr. G. J. Guthrie (*v. Brit. Jl. of Ophthal.*, Vol. III, p. 145, 1919) under the patronage of the Duke of York and with the active support of the first Duke of Wellington, under whom Guthrie had served with great distinction as an Army Surgeon during the Peninsular War. An immense amount of disablement had been caused among the troops serving in the Napoleonic Wars by disorders of the eyes, especially by the so-called Egyptian ophthalmia. One of Guthrie's chief objects in founding the hospital was to enable medical officers of the Army and Navy to obtain instruction in the treatment of diseases of the eye, and he admitted such officers without fee to his courses of lectures.

Guthrie first saw patients at his private house in Berkeley Street, on the site of the present Berkeley Hotel. On January 1, 1817, the hospital was first opened in Marylebone Street, Piccadilly; later it was moved to Warwick Street, Golden Square. The building in King William Street, West Strand, was opened in 1832 and there the hospital remained for ninety-six years. Enlargements and alterations were made from time to time to provide increased accommodation, but the limits of extension upon the old site were reached some years ago, and removal to a larger site became

imperative if the work of the hospital was to be efficiently carried on.

The out-patient department in the new building was opened on April 10 last, and it is hoped that the remainder of the hospital will be completed within a few weeks. An important feature of the new hospital is the provision of a number of rooms for paying patients, in order to meet the needs of those who cannot afford the cost of treatment in private nursing homes.

The Oculist

In the *Trans. Ophthal. Soc. U.K.*, 1921, p. 342, will be found an account of Sir William Read, Oculist to Queen Anne. A tract in the British Museum, with the above title was alluded to as a fulsome eulogy. We recently secured a copy of the tract in question and give some extracts here for the amusement of our readers.

The tract is a small quarto, published in 1705; it is anonymous, and consists of five pages of introduction and 113 lines of poetry. Sufficient extracts from the introduction are given in the paper in question; here we propose to take a few couplets from the poem.

"The OCULIST moves in an Orb more bright:—

The EYE's his Province; that bright Optick Sphere,
By which we move, and act, and guide, and steer.—

No Price too high the darling EYES to save,
When Life without 'em's but a walking Grave.—

And if bold Esculapius cou'd aspire
So high, to claim Apollo for his Sire,
The OCULIST, with his more shining WORTH,
Is sure the radiant Phoebus Eldest Birth:—

READ is the leading CONQUEROR in this Field.—

Your ministring Art and unbought Labours given
For no Return, unless repay'd by Heav'n.
So frankly good, and so profusely kind,
Has Your long Charitable Glory shin'd;
So bred in tender Pity's generous School,
Kind as the Angel at Bethesda's Pool."—

Enough extracts have been given from this poem; it would have been interesting to have known who was the author of these lines. They should be compared with the lines by the Chevalier Taylor's grandson, quoted by Coats in the last volume of the Moorfields Hospital Reports. To the best of our recollection they deal with

an unsatisfactory result of a cataract operation performed by a qualified surgeon, and end up:

"Hence nothing I could say should smart 'em,
The eye was lost secundum artem."

Most of us have lost an eye or two, *secundum artem*, in our time; but we would rather not break out into verse about it.

The tract in question has been presented to the Bowman Library.

COUNCIL OF BRITISH OPHTHALMOLOGISTS

Annual Report

THE Council presents its report for the Session 1927-28. At the first meeting the following were elected as officers:—President: Mr. J. Herbert Fisher; Vice-Presidents: Sir George Berry, M.P. and Sir John Parsons; Hon. Treasurer: Mr. M. S. Mayou; Hon. Secretary: Mr. Frank Juler.

The following were appointed to serve on the Executive Committee: The President and Hon. Secretary (*ex officiis*), with Mr. E. Treacher Collins, Sir John Parsons, Mr. M. S. Mayou and Mr. W .H. McMullen.

The Optical Practitioners (Registration) Bill, 1927

Continuing its action in opposition to this Bill, to which the Council referred in its last annual report, a special committee prepared a statement of evidence. The Council, having approved this draft, nominated the President with Messrs. Adams, Gray Clegg, Mayou, Walker and Whitehead to attend and give evidence before the Departmental Committee appointed by the Minister of Health. The report of the Departmental Committee has since been published. (H.M. Stationery Office, Cmd. 2999.)

Medical Certificates of Blindness

The Council was approached as to the remuneration available for medical men supplying certificates of blindness in the case of persons applying at voluntary hospitals. The Council obtained from the Ministry of Health a statement which has been published in the BRITISH JOURNAL OF OPHTHALMOLOGY (Feb., 1928, pp. 96-98). This statement enumerates clearly the several bodies by which such certificates are required, and shows for what certificates funds should be available.

Treatment of Ophthalmia Neonatorum

The Council has received a report from its Committee appointed "To inquire how far the recommendations of the Departmental Committee on the Causes and Prevention of Blindness with reference to ophthalmia neonatorum have been put into practice, and to advise the Council as to any action it might be advisable to take."

The Council adopted and published this report (*Brit. Jl. of Ophthal.*, March, 1928, pp. 149-154), and copies of the report with appropriate digests have been sent to the Ministry of Health, the General Medical Council and the Central Midwives Board.

Eyesight Tests for Staffs of Indian State Railways

The Council considered a letter from Dr. Cairns, the chairman of the Standing Advisory Committee of Medical Officers of the Government of India, asking for criticism on the draft minutes of his committee with regard to Standards of vision and procedures of sight testing for employees of State railways. A sub-committee presented a report which was approved by the Council and forwarded to Dr. Cairns.

Industrial Eye Diseases and Accidents

An interim report has been prepared by the Committee appointed "To consider what effect has been given to the recommendations of the Departmental Committee on the Causes and Prevention of Blindness in respect of industrial eye diseases and accidents, and to advise the Council as to any further action the Committee thinks desirable." A considerable amount of information has been collected, and the Committee is continuing the investigation.

The Council desires to thank the National Committee for the Prevention of Blindness (U.S.A.) for continuing to send copies of its publications.

The expenses of the Council have been defrayed, as in former years, by its members.

The Council desires to thank the Council of the Royal Society of Medicine for the use of rooms for meetings.

THE ANNUAL CONGRESS OF THE OPHTHALMOLOGICAL SOCIETY OF THE UNITED KINGDOM, 1928

THE Annual Congress of the Ophthalmological Society of the United Kingdom was held at the Royal Society of Medicine, London, on Thursday, Friday, and Saturday, April 19, 20, and 21, under the presidency of Mr. Charles Howard Usher.

The President opened the meeting with an address on the relationship between animals' eyes and human ophthalmology. He remarked that there was only one original work in English on diseases of the eye in animals, although animals' eyes were much used for teaching and training purposes. He then dealt at considerable length with the eyes of albino animals, stating that of all the eyes examined, only two were found to be completely devoid of pigment.

Mr. Treacher Collins read a paper on the natural history of retinal glioma, in which he explained its limitation to the early years of life by the fact that it arises from cells which became highly specialized and soon lost all capacity for reproduction, and is a tissue which contains no "mother cells."

Lieut.-Col. H. Smith read a paper on the early stage of cataract and its diagnosis. He said that in India the development of cataract was much more rapid than in Europe. He had treated loss of transparency in the lens with subconjunctival injections of cyanide of mercury, and regarded incipient cataract as a curable condition.

Mr. E. Wolff read a paper by himself and Mr. F. Davies on fragmentation of the retinal blood stream, a condition, usually regarded as a post-mortem phenomenon, which they had been able to produce and abolish at will in the living animal.

On Thursday afternoon a clinical meeting was held at the Royal London Ophthalmic Hospital, where many interesting cases were shown, among them being a cyst of iris (Mr. Griffith), a case of corneal leucoma treated with gold chloride (Mr. Doyne), congenital aniridia with dislocated lenses (Mr. Whiting), retinitis pigmentosa with a family tree tracing the condition back for 120 years (Mr. Hine), retinal cyst (Mr. Hine), and a selection of slit-lamp cases (Mr. Goulden).

In the evening a discussion was held on the causes and treatment of irido-cyclitis with raised tension. Mr. R. A. Greeves spoke mainly on the pathology of the condition, illustrating his remarks by lantern slides of some cases. Mr. W. H. MacMullen followed with some remarks on treatment. He distinguished three types: (1) acute, with raised tension soon after onset; (2) cases resembling

acute or sub-acute primary glaucoma; and (3) chronic, with increased tension some considerable time after onset. Sir Arnold Lawson said that he did not favour the use of miotics in any of these cases, and Mr. Gray Clegg quoted the statistics of his own cases, with the results he had obtained by various means of treatment. Mr. Basil Graves, Mr. Harrison Butler (who divided the cases into medical and surgical), Mr. Whitehead, and several others joined in the discussion.

On Friday morning the subject for discussion was "The Diagnosis and Treatment of Inflammatory Affections of the Orbit."

Mr. A. F. MacCallan classified the cases according to their aetiology, and quoted some examples. Mr. Norman Patterson said that the antrum and sphenoidal sinus were rarely responsible. He discussed treatment under three heads: (1) general and nasal; (2) orbital; (3) treatment of complications. Dr. P. Watson-Williams described the diagnosis of slight chronic infections of the sphenoidal and ethmoidal sinuses by examination with the endorhinoscope and the use of the suction syringe. Mr. Somerville Hastings emphasized the necessity of remembering the part played by syphilis in some cases. He described two types.

Mr. E. D. Davis presented a series of cases of orbital oedema sent for nasal examination. Of these, 48 per cent. were due to frontal sinusitis and 21 per cent. to ethmoidal sinusitis. In no case was the antrum or sphenoidal sinus responsible. He recommended early and free incision, and the avoidance of drainage tubes.

There were many other speakers.

In the afternoon Dr. A. W. Mulock Houwer read a paper on the origin of melanomata of the uvea; Mr. Goulden described some unusual types of acquired cataract, in which he pointed out the usefulness of the slit-lamp in enabling us to determine the exact character of lenticular opacities, and also read a paper by himself and Mr. E. F. Fincham on the illumination of the field of operation in ophthalmic surgery, with diagrams and details of the arrangement of light for each kind of operation; and Mr. A. F. MacCallan presented a series of "Private Cases with Full Vision after Correction. Indications for Reference to Other Branches of the Medical Profession of those Showing Evidence in the Eye of Toxic Conditions."

Professor Elliott Smith then delivered the Bowman Lecture on "The New Vision," in which he dealt with the change in the central connections of the eye from the mid-brain to the visual cortex, as one ascended the scale of the animal kingdom. He said that in the rabbit one began to get the first signs of overlapping of the visual fields and rudimentary binocular vision. In this animal, too, the optic tract began to be connected with the external geniculate body. In man, all connection with the superior colliculi

vanished, the whole of the optic tract ending in the external geniculate body, and being continued on to the visual cortex by the optic radiations, which are only found in mammals. The lecture was profusely illustrated with lantern slides and diagrams.

On Saturday morning, Mr. M. S. Mayou read a paper on the juvenile form of Coats' disease, Mr. G. Alexander described an operation for the immediate removal of congenital cataract, which he performed instead of needling, and Mr. Williamson-Noble read a paper on "Retinoscopy and the Pointolite Lamp."

A full account of the papers and discussions will be published in the Transactions of the Society: the above is merely an indication of the subjects of debate. A small ophthalmological museum was arranged by Mr. Humphrey Neame. On Saturday afternoon a visit was paid to the Lister Institute of Preventive Medicine.

The annual dinner of the Society was held at the Langham Hotel on the Friday night. The chairman was Mr. C. H. Usher, the President of the Society.

G. G. PENMAN.

ABSTRACTS

I.—THE OCULAR MUSCLES

(1) **Weill, G., and Nordmann, J. (Strasbourg).—Congenital absence of abduction.** (**L'Absence congénitale de l'Abduction.**) *Arch. d'Ophtal.*, October, 1927.

(1) **Weill** and **Nordmann** have made a comprehensive study of this congenital defect and write at length thereon. They classify all cases under two headings: (1) congenital absence of abduction associated with retraction of the eyeball; and (2) congenital absence of abduction without retraction of the eyeball.

Three cases in Group 1, reported by the writers, were characterized by complete loss of abduction, retraction of the globe, and more or less narrowing of the palpebral fissure during adduction. Adduction in this type of case is generally restricted. The retraction of the eyeball may be directly backwards but not infrequently is accompanied by deviation up or down. Vertical movements of the globe are seldom affected, visual acuity is often low. Diplopia is exceptional. In this group the anatomical basis of the defect, whether single or multiple, is in the orbit, *i.e.*, is peripheral. In Graefe-Saemisch the description of this defect will be found in the volume on "Diseases of the Orbit."

In Group 2, in which there is congenital absence of abduction *without* retraction of the eyeball the site of the lesion may be

peripheral, but on the other hand, it may be in the nerve centres. The loss of abduction power may be unilateral or bilateral; it is generally the only congenital defect, but in some instances is associated with facial palsy. Convergence of the visual axes is sometimes noticeable, but it is not unusual to find parallelism in the primary position. Diplopia is exceptional.

A valuable list of references, limited to recent articles and to those furnished with a bibliography, is appended.

J. B. LAWFORD.

(2) **Fink, W. H. (Minneapolis, Minn.)—Significance of latent ocular muscle imbalance.** *Amer. Jl. of Ophthal.*, March, 1927.

(2) **Fink's** investigation concerns the findings in thirty-five patients who had no symptoms of eyestrain, and his object was, not to criticise or disprove the work of others, but to attack the problem of latent muscular imbalance from a new angle. The cases were those requiring some minor surgical operation, *e.g.*, removal of a chalazion, or a pterygium, suture of a laceration in the lid, etc., since such patients could be kept with one eye covered for ten days without objection on their part. The cases were carefully examined before the eye was covered, and only those were chosen who were of average intelligence, were free from symptoms of eyestrain, and had only a slight muscle imbalance and refraction error with normal visual acuity. One eye was covered with gauze, fastened in place with adhesive strapping, which was removed when the full correction was in place and the Maddox rod before one eye, so that at no time during the entire period was there binocular vision. The muscle balance was taken at the end of three, seven, and ten days, and the results are given in a table. This table shows that of the 35 patients examined, only 3 showed no change of muscle balance. One case developed hyperphoria, corrected by a 7° (refracting angle) prism, 5 from 3—4°, 10 from 2—3°, and 15 from 1—2°: the results in esophoria and exophoria were somewhat similar. The author concludes that "it is impossible, because of the small number of cases examined, to make a statement as to the real significance of imbalances uncovered in eyes free from symptoms, but it at least suggests the possibility that many deviations uncovered, should not be looked upon as pathologic."

F. A. WILLIAMSON-NOBLE.

(3) **Alger, Dr. Ellice M. (New York).—Suspension of the fusion impulse as a therapeutic measure.** *Arch. of Ophthal.*, September, 1926.

(3) **Alger** does not suggest suppression of the fusion for routine use, but merely as an alternative method of handling difficult cases. He is of opinion that too much stress is laid on the importance of

fusion, since many patients, in whom the faculty does not exist seem to get along, for all practical purposes, as well as their fellows. Moreover the patients are free from that troublesome set of symptoms, known as muscular asthenopia. We have possibly been considering fusion too much from the theoretical laboratory point of view, rather than from the basis of practical every-day life. The author has found suppression of fusion useful: (1) in some cases of marked anisometropia; (2) after removal of cataract from both eyes; (3) in some cases of incomplete motor paralysis; (4) in some cases of insufficiency, especially of convergence; (5) in some cases of motor spasm. The methods employed fall into three categories: (1) those which absolutely exclude one eye; (2) those which reduce the retinal stimulus; (3) those which are primarily aimed at the fusion centres. With regard to methods (1) and (2) many patients object to wearing a shade or coloured glass and good results may often be obtained by ordering a convex spherical or cylindrical glass which is strong enough to blur vision. In presbyopic patients this glass may be made to correspond with the reading correction. Again in some cases of presbyopia with marked convergence insufficiency, a bifocal over one eye alone renders fusion of near images unnecessary. The methods directed at the fusion centres, consist in separating images by prisms until they cannot be combined and training the patient to study one and disregard the other, just as the surgeon is trained to use an ophthalmoscope with both eyes open.

F. A. WILLIAMSON-NOBLE.

(4) Dunnington, Dr. John H. (New York.)—Divergence excess; its diagnosis and treatment. *Arch. of Ophthal.*

(4) **Dunnington** follows in the main the description of this condition given by Duane in Fuchs' "Ophthalmology." He is of opinion that parallelism of the eye is not merely a matter of relaxation of convergence, but that there is superadded an active stimulation of the divergence centre. Should this stimulation become too great, the condition of divergence excess is developed, a pure case of which presents the following characteristics:

(1) Exophoria for distance. This is best estimated by the screen and parallax test, since, with the Maddox rod, the patient often makes a definite effort to bring the light and the red line into alignment, thus diminishing the exophoria. The author has found this diminution amount to as much as 15°.

(2) Prism divergence. A normal individual cannot obtain binocular vision in the distance with a prism of more than 8° base in. In divergence excess, however, the figures are higher, and as much as 33° has been overcome.

(3) Prism convergence, on the other hand, is within the normal

limits of 15°-30° at 20 feet unless there be a secondary weakening of convergence power.

(4) Muscle balance at thirteen inches is normal, and,

(5) The convergence near point is normal in position.

(6) There is no limitation in the movements of either eye.

(7) Diplopia may be present in marked cases, and, if so, is found only in distant vision. It is more marked when looking above the horizontal plane, since there is a natural tendency for the eyes to converge on looking down. Divergence excess has to be diagnosed from:

(1) Convergence insufficiency which shows normal muscle balance in the distance with marked exophoria at 13 inches, and

(2) Insufficiency of an adductor, when there is impairment of movement in the direction of action of the paretic muscle. Many cases of divergence excess become complicated later by a secondary convergence insufficiency, and the reverse also occurs. The condition is found in its pure form in childhood and early life. Sometimes a momentary convergent strabismus is associated with it, due to a temporary spasm of convergence. The symptoms consist in headache, asthenopia and a sense of confusion on watching distant objects, particularly when they are moving or are brightly illuminated. Many of these patients abhor crowds and are liable to train sickness. The condition may remain stationary for a number of years, but the general tendency is for it to progress slowly until an actual divergent squint develops, first for distance and later for near, due to the associated convergence weakness. Treatment consists in tenotomy of one or both external recti, according to the degree of defect. Prisms are of no use since they cannot be worn in high enough powers to be of any material assistance.

The author aims at producing an immediate over-correction of ten or more prism degrees.

F. A. WILLIAMSON-NOBLE.

(5) **Marlow, F. M. (Syracuse).—Observations on the prolonged occlusion test.**

Clark, C. P. (Indianapolis, Indiana).—Diagnosis of latent vertical deviations of eyes by use of prolonged monocular occlusion. *Amer. Jl. of Ophthal.*, August, 1927.

(5) **Marlow** states that "just as cycloplegia is the most efficient means of revealing latent hypermetropia and astigmatism, so the prolonged occlusion test is the most efficient means at our disposal for rendering manifest, or at any rate more manifest, the true state of the muscle balance." Although not strictly comparable, figures show a tendency to a higher degree of latency in heterophoria than in ametropia. The importance of prolonged occlusion is shown by

two graphs indicating the state of the muscle balance on successive days over a period of two weeks, during which one eye was kept covered, except when it had the Maddox rod in front of it. The first chart shows originally a low hyper-exophoria, changing on the second day to esophoria and later to a high degree of exophoria. Marked changes may also occur in the muscle balance at the near point. Partial correction of the post-occlusion error of muscle balance will, in the author's experience, often bring about a cure of long standing asthenopic symptoms.

Clark has also found prolonged occlusion useful in cases of asthenopia with heterophoria. In his experience, however, it is seldom necessary to cover the eye for longer than twenty-four hours in order to overcome the muscular spasm induced by the heterophoria. A gauze dressing was used over the eye with worse vision. Indications for the procedure are:

1. In all examinations of the ocular muscles before any operative procedures are attempted, except in concomitant convergent strabismus.

2. In all refraction cases that come under the following groups:

(1) Patients who are disturbed by moving objects, as when viewing motion pictures, riding on trains, or being in crowds; (2) all cases of persistence of asthenopic symptoms when the proper ametropic correction has been worn; (3) those persons complaining of photophobia when wearing glasses; (4) cases in which a low amount of vertical or a large amount of horizontal heterophoria, is disclosed by any of the common tests without occlusion; (5) those persons in debilitated health who complain of ocular discomfort when wearing their proper correction.

In the author's experience it is the correction of hidden hyperphoria which is the most important point, and exophoria, unless of high degree, caused no trouble. The paper concludes with four illustrative cases. One of these was a woman, aged 34 years, in whom glasses for correction of hypermetropia and astigmatism failed to give relief. With the Maddox rod test there was no hyperphoria. Occlusion of the left eye for twenty-four hours brought out a right hyperphoria of 3°. The incorporation of a 2.5° prism base down in the lens for the right eye, resulted in complete disappearance of her asthenopia.

F. A. WILLIAMSON-NOBLE.

(6) **Morgan, A. M. (Adelaide).—The causes of concomitant strabismus.** *Med. Jl. of Australia*, August 20, 1927.

(6) **Morgan's** paper was the opening address in the Section of Ophthalmology of the Australian Medical Congress (British Medical Association) at last year's meeting. The author expresses his dissatisfaction with all the general views of the aetiology of

squint, but fails to offer any very sufficient substitute. He lays great stress on the importance of heterophoria as an assistant to defective fusion sense, while considering errors of refraction to be of minor importance. He publishes a table of a series of 1,766 patients examined for heterophoria of whom 633 had esophoria, 543 exophoria and 592 orthophoria. By dividing the cases into two age groups, 5 to 10 and 11 to 75, a very different proportion was obtained. In the first group the proportion of exophoria to esophoria was 1 to 2.45, and in the second group 1 to 1.06. Unfortunately tests for heterophoria are not very reliable in patients under seven years of age.

Morgan sums up as follows: "There are three causes of concomitant squint. These are in the order of their importance: (1) weakness of the fusion sense; (2) heterophoria; (3) hypermetropia. The first only is essential but must be accompanied by one of the others." (The meaning here seems a little obscure, if the first must be accompanied by one of the others surely it is not the only essential one.) He goes on to say that: "the determining factor in the development of a squint is the relation between the desire for fusion and the effort to align the eyes correctly. If the desire for binocular vision be greater than the effort, there will be no squint. If the effort be greater than the desire then a squint will result. Hypermetropia plays a very minor part in the causation of convergent squint. Myopia as an error of refraction has no part in the causation of divergent squint, though it may have indirectly owing to the greater tendency to exophoria in myopic eyes."

E.E.H.

(7) **Ronne, Dr. Henning (Copenhagen).—On the mechanics of the squint operation.** *Arch. of Ophthal.*, September, 1927.

(7) **Ronne's** article opens with a consideration as to how far the correction of squint by operation depends on the change of muscle insertion. At first sight it would appear that if by advancement or tenotomy, we shift the point of insertion of the muscle 10 mm. the apex of the cornea will move by a corresponding amount. This could only occur, however, if an advancement and tenotomy of 10 mm. each were performed on the same eye. The result of the single operation would, therefore, be a displacement of only 5 mm. Another way of looking at this question is to consider the internal and external rectus as forming a loop. If one side of the loop be shortened by 10 mm., the total displacement of the eye can only be 5 mm. After tenotomy, the two corresponding muscles will be shortened and relaxed respectively. This will entail no insufficiency in their action. When insufficiency occurs, therefore, it is a matter of insertion insufficiency. With regard to

the incidence of secondary (usually divergent) squint after operation, statistics show that the youth of the patient has no effect in increasing the percentage of divergence. In fact the reverse is the case, so that there is no reason for postponement of operation until a later age. The effect of upward or downward displacement of the tendon is interesting. At first sight, one would expect upward displacement to cause a secondary upward displacement of the eye, but in actual practice the effect is to move the eye downward. The author's explanation of this is a little difficult to follow. He attributes it to a conjunctival effect, due to the sutures exerting a tightening influence on this membrane.

F. A. WILLIAMSON-NOBLE.

(8) **Bettremieux (Paris).—Strabo-tenotomy of the deviated eye. (La strabo-ténotomie de l'oeil devié.)** *La Clin. Ophtal.*, December, 1926.

(8) If the reader will turn to the 1924 volume of this journal he will find on page 191 an abstract of **Bettremieux's** article in *La Clin. Ophtal.* for June, 1921, dealing with operation on the non-deviated eye. "When the fixing eye is correctly operated on there is no change in the external appearance or motility of this eye, since the desire for sharp vision easily keeps it in correct position in all directions of fixation." It is also there mentioned that the author makes no special reference to the actual operation, whether tenotomy, advancement or combined. In the article under review (December, 1926) it appears that Bettremieux's preference is for tenotomy only of the non-deviated eye, reserving tenotomy or advancement of the deviated eye for exceptional cases.

ERNEST THOMSON.

II.—DISEASE OF THE LENS

(1) **Gnanadikam, G. Joseph (Tirupatur, Southern India.) The prevention of infection in cataract operations.** *Indian Med. Gaz.*, p. 634, November, 1927.

(1) This record of work in India is of some interest, contrasting strongly in some respects with the usual procedure in this country. It is an account "of what is being successfully tried in the Swedish Mission Hospital, Tirupatur, under Dr. F. Keugelberg." But no figures are given of the results obtained.

Every eye has to undergo the following routine before operation.

First day, morning: Swabbing the conjunctiva of the lids with silver nitrate, 2 per cent. solution. This produces a thin superficial slough which is thrown out, and carries with it any bacteria present. Evening: Yellow ointment (ung. hydrarg. oxid. flav. 2 per cent.).

Second day, morning: Yellow ointment. Evening: Yellow ointment. Third day, morning: Yellow ointment. Evening: Zinc sulph. and ichthyol ointment (0.50 per cent. each). Fourth day, operation. If there is discharge the yellow ointment is continued until it ceases and the eye is fit for operation. Usually after three or four days the eye is free from any discharge and is quite clean. "Cases with uncomplicated trachoma we do not generally mind much, unless there be persistent discharge. Except in one or two cases, trachoma has not influenced in any way the course of healing. But usually there is post-operative conjunctivitis, which is relieved by copper ointment 5 per cent. daily."

Just before the operation a few drops of freshly prepared silvol (20 per cent.) are instilled, and the eye is thoroughly flushed with luke-warm saline, say about 8 ozs. The object of using the silvol is not so much for its antiseptic action as for its property of staining any mucus present. This helps to detect the mucus easily. The lid margins and the skin around are painted with tincture of iodine (1 per cent.). The fluid that collects in the conjunctival sac during the operation is now and then sucked off with a sterilized pipette. "We thus clear off a good amount of fluid which may be a prospective source of infection, if it should ever chance to get into the chamber." External canthotomy, to effect better drainage, is done in cases of deep-seated eyes with small palpebral fissures. This canthotomy also serves the purpose of removing any possibility of the knife coming in contact with the canthus during the incision. A small conjunctival flap is always made. A preliminary iridectomy is performed at a separate sitting only in cases where the eye does not get quite clean in spite of all treatment. "We always avoid irrigating the chamber, even if there be soft cortex remaining.

"Sometimes, but seldom now, there is a mild iritis showing a somewhat muddy chamber. This is more often due to sensitiveness to the foreign lens protein, than to the trauma to the iris during the operation. It is rarely a regular infection. This muddiness clears during the next few days after an injection of about 8 to 10 c.c. of cow's milk intramuscularly in the gluteal region. Even what appear to be regular infection cases sometimes get round after this milk injection."

H. HERBERT.

(2) **Charamis, Spilios (Athens).—The great value of preliminary iridectomy in the cataract operation. (De la grande valeur de l'iridectomie préparatoire dans l'opération de la cataracte.)** *La Clin. Ophtal.*, September, 1927.

(2) **Charamis** has become a complete convert to the operation of cataract with preliminary iridectomy. There is nothing new in the arguments *pro* or *contra* which he adduces except this, that in

his hands the operation with preliminary iridectomy has been eminently successful. The author is able to deal with the personal statistics of 2,375 cataract operations of various kinds in twenty years of practice; no mean achievement. The following are his figures: simple extraction 93 per cent. of successes, extraction with simultaneous iridectomy 97 per cent., and extraction following preliminary iridectomy practically 100 per cent. since there were 320 successes out of 321 operations. The only criticism which one might make of these figures is that the last category, that of preliminary iridectomy operations, is considerably smaller than the one-third of the total operations performed.

ERNEST THOMSON.

(3) **Jacqueau (Lyon).—Palpebral suture, with or without a dressing, after cataract operation). (Suture palpébrale avec ou sans pansement après opération de cataracte.)** *La Clin. Ophtal.*, July, 1927.

(3) **Jacqueau** discusses the question of dressing cataract operations in the usual way or of employing the method of palpebral suture with or without a very light covering. An interesting illustration of the differing views of operators is given by the following quotation. "Everything concerning post-operative dressing has been tried. From time to time its disappearance has been decreed but it has resisted every attack. When (at the International Congress of 1900) Schiötz of Christiania was advising its absolute suppression, I was almost daily assisting, with my master Gayet, at long operating séances after which each patient, without exception, was armoured with a thick binocular dressing solidly fixed to his face by means of adhesive paste. This was not removed till the seventh day no matter what should happen. Both methods claimed and proved their success." For himself the author prefers to employ a binocular dressing in ordinary cases, but there are numerous cases (as we all know) in which a dressing is badly tolerated and is likely to be disturbed or torn off. One need not enumerate them. In such cases the author, after taking special care with anaesthesia of the globe by means of retrobulbar injection of novocaine and a small injection into the lids, introduces a suture into the upper lid prior to operation. The suture takes a firm hold of the tarsus itself and emerges on the free border of the lid. After completion of the section this suture can be used in place of the blepharostat which should then be removed. When the operation is finished the needle, which is still attached to the silk is passed through the free edge of the lower lid and the thread lightly knotted. The author thinks that in general it is better to apply a light binocular dressing for a day or two, but should the patient tear this off it does not matter very much because finding

that he cannot open his eyelids the patient does not insist on trying to do so. The eye can be inspected every day through the gaps left on each side of the stitch, and, if necessary, lavage of the eye can be carried out also.

ERNEST THOMSON.

(4) **Ellis, Zenas H. (New York).—Non-operative treatment of cataract with report on lens antigen treatment.**

Davis, A. E. (New York).—Discussion of Dr. Ellis's paper. *New York State Jl. of Medicine,* December, 1927.

(4) **Ellis** opens his paper with a résumé of the results claimed by **Davis**, who treated 72 patients with 131 cataracts. Of these 27.5 per cent. were arrested and 65 per cent. cured or improved, making a total of 93 per cent. of cataracts which had responded favourably to his treatment. Ellis rightly says that such a revolutionary discovery is worthy of further study by others of an unbiased mind. The question is of course difficult to settle because many cataracts seem to be self-limiting and never go on to maturity while some even seem to disappear automatically. Since Davis's treatment consists in the injection of lens antigen, the work of Guyer and Smith has an important bearing on it. These authorities found that lens tissue of rabbits and mice when injected into fowls, brought about the formation of antibodies. If the serum of the sensitized fowl be injected into pregnant rabbits and mice, it may attack *in utero,* the lenses of the young of the species used as antigen. The reaction is not invariable, possibly because the placenta is impervious to such antibodies except when there is an occasional rupture of a placental blood-vessel, allowing a direct mingling of foetal and maternal blood. It will be noted that there was no effect on the mother and that the effect was produced on the offspring only because of the presence of blood-vessels on the foetal lens. With these observations in mind, it is difficult to understand how lens antigen could have any effect on an adult human being. Moreover, if any effect were produced it should be in the direction of causing cataract rather than of removing it. Davis on the other hand believes that a solution of emulsified lens of an animal injected into the human, will cause the active formation of antibodies which will seek out the lens, invade it and cause absorption of its opacities. The author decided, therefore, to treat 27 patients following implicitly the details of Davis's techinque with the result that 14 of them showed progressive development of the cataract, 13 showed no change. There was no improvement of vision in any of the cases, and the slit-lamp failed to reveal any absorption of the opacities.

Davis's reply is published in the same issue. He states that arrest of progress of the cataract in 50 per cent. of cases is excellent, since Jackson gives 17.39 per cent. as being the usual figure. He also quotes his own figures which show improvement of vision in 37.5 per cent. of cases, whereas in the untreated cases recorded by Jackson improvement results in only 7.73 per cent., and on the other hand deterioration of vision occurred in 74.88 per cent. of the Jackson series and in only 30.2 per cent. of his own. It is Davis's opinion, therefore, that "every incipient senile cataract except the nuclear type, should have specific lens antigen treatment."

F. A. WILLIAMSON-NOBLE.

III.—MISCELLANEOUS

(1) **Lagrange, F. (Bordeaux.)—Ocular hypotonus: its causes, dangers and treatment. (L'Hypotonie oculaire, ses causes, ses dangers, son traitement.)** *Arch. d'Ophtal.*, May, 1927.

(1) The variety of lowered intra-ocular pressure under discussion is not that resulting from irido-cyclitis or inflammatory disorganization of the deep ocular tissues, but that met with in eyes preserving in greater or less degree their visual function and capable of complete restoration of their function under appropriate treatment. In this lengthy article, some portions of which will be familiar to readers of **Lagrange's** book "Glaucome et Hypotonie," the author notes that the subject of hypotonus has been studied by comparatively few ophthalmologists since von Graefe. He gives references to the writings of these observers, including a recent study by one of his pupils (Sainz, 1926).

Ocular hypotonus is the condition of an eye retaining vision in which the pressure has fallen to 15 (Schiötz) or lower. "It is a symptom comparable to hypertonus and, like the latter, more frequent than is generally recognized by ophthalmologists." Lagrange believes that hypotonus is a great danger to an eye; in this he disagrees with some other writers who state that the nutrition of the eye is not thereby impaired.

Statistics indicate that hypotonus is present in 25 per cent. of eyes with myopia of more than 10D. Traumatism is another frequent cause.

The chief dangers of hypotonus are, the writer states: (1) visual defects of retinal origin; (2) haemorrhage, especially from the small vessels surrounding the macula; (3) detachment of the retina; (4) complicated cataract.

The local treatment of this condition of lowered pressure advocated by Lagrange and by which he has obtained satisfactory results is that designated "colmatage." This consists in inducing the formation of cicatricial tissue around the corneal margin, whereby the channels for the escape of intra-ocular fluids are obstructed or obliterated. Details of the procedure adopted are given in the author's book referred to above. In brief it is achieved by the use of the galvano-cautery applied to the sclera over the region of Schlemm's canal after dissecting up the conjunctiva. This leads to the formation of a dense relatively impermeable connective tissue. To obtain a similar result posteriorly, irritating injections of salt or cyanide of mercury are employed. The beneficial results of such deep injections in the author's view are due to the production of new connective tissue thickening the sclera and rendering it less permeable, and by these means obliterating the lymph channels around the venae vorticosae.

The paper includes notes of twenty-nine clinical observations.

J. B. LAWFORD.

(2) **vom Hofe, K., and Periwitzschky, R.—Pupil and middle ear (Pupille und Mittelohr.)** *Arch. f. Augenheilk.*, Vol. XCVIII, May, 1927.

(2) Schiff and Herzen originally surmised that the pupil-dilating nerve fibres pass through the tympanic cavity. Later, various researchers found by experiment that the pupil-dilating fibres actually pass through the middle ear, partially in the rabbit and the dog and wholly in the cat. The experiments resulted in contraction of the pupil on the side of the experimented ear. It is also found that, in man, bringing a vibrating tuning-fork near the mastoid process produces at first contraction of the pupil on the same side and then on the opposite side. The reflex is most readily induced in young excitable individuals, sometimes even when the individual is stone-deaf.

In view of these findings **vom Hofe** and **Periwitzschky** set about observing if in diseases of the middle ear the occurrence of anisocoria is more frequent and accentuated. They examined 100 cases taken from the University Ear Clinic, Jena; 29 per cent. of these showed unequal pupils; 63 of the cases were of middle-ear disease; 31.4 per cent. of these had anisocoria. Of the 63, 46 were of unilateral disease with 30.4 per cent. of anisocoria. From this analysis the authors conclude that in middle-ear disease anisocoria is neither more frequent nor more accentuated than otherwise found. Above all, the difference in the size of the two pupils was by no means striking. Thus from cases of middle-ear

disease no conclusion can be drawn regarding the course of the sympathetic pupillary fibres in man. Conversely, anisocoria cannot be reckoned as a sign of middle-ear disease.

D. V. GIRI.

(3) **Ramsay, A. Maitland (St. Andrews).—Diathesis, or the influence of soil in the causation and treatment of disease.** *Glasgow Med. Jl.*, August, 1927.

(3) The reviewer is inclined to think that **Ramsay** has not chosen his title well. One's first impression is that the word "soil" is used in its primary sense and one's second is that the article does not deal with ophthalmology. Both assumptions would be wrong for "soil" is used figuratively and a large portion of the article deals with strumous ophthalmia and the scrofulous diathesis. A diathesis is defined as a bodily condition predisposing to a particular disease. There are three distinct types, the neurotic, the arthritic, and the scrofulous. The author gives a clear and very graphic description of these and illustrates the third by a close description of the symptoms, ocular and general, of strumous ophthalmia. He divides the scrofulous diathesis into two types, the "ugly" and the "attractive." Both are well known to us, but it is doubtful whether anyone has hitherto employed these terms to describe the types. In the ugly type the children are described as slow and lethargic, with pale skin, coarse features, snout-like mouth and short neck thickened by masses of enlarged suppurating glands. In the attractive type the children are quick and alert both physically and mentally. As a rule they have regular features with a delicate pink and white complexion, long, silky eyelashes, and although the glands in the neck are usually enlarged they do not form the large suppurating masses characteristic of the ugly form.

The key to the treatment of strumous ophthalmia is the constitutional state. The patient rather than his eyes requires attention. The essence of the disease lies in malassimilation, the result of the inborn error of metabolism aggravated by improper feeding. Precise directions regarding diet must be given, and, in particular, sugar in every shape and form, biscuits, pastries, potatoes and such like foods must be rigidly excluded. In this article, which represents a paper read before a general medical audience, many useful words are said and many hints given which may be commonplace to the man who never forgets anything but which are invaluable to the ordinary mortal who, when his patient has departed "remembers that he has forgotten" to give such-and-such an instruction.

ERNEST THOMSON.

(4) **Terrien, F., Sainton, P., Veil, P. (Paris).—Two cases of van der Hoeve's syndrome: blue sclerotics—fragility of bones—deafness.** (**Deux cas de Syndrome de van der Hoeve: Oeil bleu—fragilité osseuse—surdité.**) *Arch. d'Ophtal.*, May, 1927.

(4) The occurrence of blue sclerotics in individuals prone to fracture of bones following slight injuries, is not very uncommon. The co-existence of auditory defects was pointed out by van der Hoeve, who believes that this symptom, due to sclerosis of ossicles or vestibular lesions, is almost constantly present. The two cases here reported occurring in Mme R. and her daughter were shown to the Ophthalmological Society of Paris. Full clinical details are recorded. The mother, aged 35 years, was very deaf, and had very blue sclerotics; she had had several fractures of bones, almost spontaneous; her teeth were friable and invariably broke during attempts at extraction; there was noticeable deficiency of calcium salts in the blood.

The daughter presented similar symptoms at 12½ years of age; hearing was already defective; the blueness of the sclerotics was less accentuated than in her mother; radiography revealed unusual transparency of some of the bones and a fracture of the ulna in the lower part.

With the corneal microscope nothing abnormal was detected in the corneae or irides of either patient: the conjunctival and episcleral circulation was not scanty, the number of blood-vessels appearing to be rather in excess. Light focussed on different parts of the sclera gave rise to pupillary reflex of unusual brilliance, indicative of thinning of the scleral coat. The family history is of interest: Mme R.'s maternal grandmother had blue sclerotics but no deafness and no fractures of bones. Her mother has blue eyes and is blind from glaucoma: she is not deaf and has been free from fractured bones.

Mme R. has two sisters and three brothers: one brother and one sister have blue sclerotics; the former hears well but has had three fractures of long bones; the latter is deaf but has escaped fractures.

Terrien, **Sainton** and **Veil** hold that without doubt van der Hoeve's syndrome is dependent upon disturbance of calcium metabolism consequent on defective action of endocrine glands; there is no available evidence as to the glands at fault.

J. B. LAWFORD.

(5) **Gaudissart, P. (Brussels).—Quantitative perimetry.** (***La périmétrie quantitative.***) *Ann. d'Ocul.*, Vol. CLXIII, p. 730, 1926.

(5) **Gaudissart** emphasizes the importance of quantitative perimetry. The visual field is composed of zones bounded by

almost circular lines known as isopters. Each isopter has a minimum visual angle which represents its visual acuity. The minimum visual angle for the centre of the macular region is 1′, for the isopter at 30° it is 4′, and for that of 50° it is 8′. The visual angle, however, varies for any particular isopter according to the attention of the patient, the illumination, etc. Two essentials demanded of perimetry are (1) the discovery of defects of small extent, (2) the demonstration of the slightest diminution of visual acuity in any area. The latter can only be accomplished by keeping in close proximity to the minimum visual angle for the region examined. The field of vision can conveniently be divided into three zones for purposes of examination.

Zone	I	from 90° to 55°	minimum visual angle	approximately		15′
Zone	II	,, 55° to 25°	,,	,,	,,	8′
Zone	III	,, 25° to 0°	,,	,,	,,	4′

For the outer zone an object of 2.5 mm. used at a distance of 300 mm. is suitable (2.5/300). It is practically impossible for an object to be manufactured sufficiently small to provide a suitable visual angle at 300 mm. For an angle of 3′ an object of 0.3 mm. diameter would be required. The carrier of the object would deflect more light than would such a minute object. It is necessary, therefore, to increase the distance between the object and the patient. Bjerrum's screen of 2.5 × 2 metres is satisfactory for the area immediately surrounding the point of fixation, but leads to inaccuracies in the visual angle at a short distance therefrom. Gaudissart describes modifications of the combined screen of Clifford B. Walker which largely overcomes the defects of Bjerrum's screen. The screen is a hollow pyramid stood up vertically on one side of its base. It is 2.5 metres wide × 2 metres, and the depth of the pyramid from the plane of its base to its summit is 30 centimetres. Whereas with a plane screen at one metre distance the error of the visual angle on the isopter of 50° is 55 per cent., with the pyramidal screen it is only 7 per cent. At the distance of two metres, a field of 27° from the fixation point is obtainable with this screen, and the error is practically nil. This screen is mounted on a frame composed of light metal tubes and fixed to a triangular metal base moving on rollers. Objects of 1.25 to 50 mm. are available. The observer is advised to carry out the examination dressed in a black coat with long black sleeves and gloves to avoid distracting the patient's attention. This is considered very important when such minute objects are employed. For the intermediate zone (55° to 30°), a 2.5 mm. object is used at a distance of one metre (2.5/1000). For the outer part of the central zone (30° to 10°), a 1.5 mm. object is approximately near the

minimum visual angle when used at a distance of two metres. Within the 10° circle, a white object of 0.6 or 0.7 mm. would be required at this distance, which is manifestly impossible. An increase of the distance to three metres is not practicable for several reasons. It is suggested that probably the most satisfactory way of testing the central field, *i.e.*, within the 10° circle, is by means of coloured objects. As in the examination of the intermediate and outer zones it is important to use a white object approximating to the minimum visual angle, so in employing a coloured object for the central field the same principle should be observed. By examination of normal subjects it was found that at one metre distance a 10 mm. object gave the following peripheral limits—for blue 15°, for red 12° to 13°, and for green 10° approximately. At one metre, 5 mm. coloured objects are not distinguished beyond the 5° circle.

It is admitted that there are great difficulties in the employment of coloured objects, for example the difficulty that is experienced by the patient in determining the exact place at which a coloured object is appreciated for its colour as opposed to its movement.

To summarize: for the outer zone, 90° to 55°, white object, 2.5/300; for the intermediate zone, 55° to 25° combined screen (pyramidal), white object, 2.5/1000; for the outer part of the central area, combined screen 25° to 10°, white object 2.5/2000 or 1.25/2000; for the central 10° zone, combined screen, coloured object 10/1000 or 5/1000. Some charts are reproduced showing marked differences in the fields taken by the different methods described.

HUMPHREY NEAME.

(6) **Roenne (Copenhagen).—The different types of defects of the field of vision.** *Jl. Amer. Med. Assoc.*, November 26, 1927.

(6) In this useful address to the Section of Ophthalmology of the American Medical Association, **Roenne** reminds surgeons of several points which are sometimes forgotten. Among them one or two may be instanced. The reason Bjerrum's sign of a curved scotoma above or below the point of fixation is not more often seen marked on the charts of visual fields in cases of glaucoma is that it is not detected unless specially searched for. It is perhaps the earliest sign of glaucoma, and is of as much importance as Roenne's nasal step. When there is a suspicion of a tumour of the hypophysis it is not sufficient to examine the temporal periphery of the visual field. A special examination for a temporal scotoma must be made, as the condition is often heralded by bitemporal scotomata.

A. F. MACCALLAN.

(7) **Stübl, Ada (Jena).—The question of foetal ocular inflammation.** (**Zur Frage der fötalen Augenentzundung.**) *Arch. f. Augenheilk.*, Vol. XCVIII, May, 1927.

(7) In this communication Stübl gives a detailed account of two cases, one of membrane formation in the vitreous and one of congenital non-specific irido-cyclitis. The first was a girl, aged 14 years, whose right eye was blind from infancy. She was said to have had no disease whatever of the eyes; the right eye in particular had never been reddened or inflamed. The left eye was normal, except for about 10° of divergence, externally the right eye resembled the left eye in every way. The right pupil did not react directly to light but its consensual reaction was normal. With the corneal microscope and slit-lamp, numerous old, evenly distributed precipitates were discovered on the back of the cornea; there were little pigment clumps and stars reminiscent of the pupillary membrane on the anterior capsule of the lens. The lens was clear and had well demarcated zones but no retrolental space was visible. The vitreous chamber was filled with a veil-like membrane whose meshes held coarse white particles. A second denser membrane ran sagitally and was moored by tough strands to the pupillary region, and to the ciliary region near the equator of the lens. The posterior strand emerged from a detached fold of retina. The retina itself had a peculiar dullness and did not show the normal reflexes. There were small clear-cut white spots. No macula-reflex and no macula-yellow could be seen with red-free light. The patient was otherwise bodily and mentally well developed. Wassermann and tubercle bacilli reactions were negative. No illness apart from measles. Nothing noteworthy in the family history.

The second was a baby girl, aged 14 days, brought to the clinic by the parents because of the child's eyes having been lustreless from birth. The history revealed nothing of importance. An elder brother and the parents healthy. No family history of tubercle. The Wassermann reaction was repeatedly negative in both parents and children. The pregnancy and confinement were normal in every way. The child looked perfectly healthy and had no stigmata of congenital syphilis and her further development was normal. The findings gathered by repeated slit-lamp examination, partly under hedonal stupor, were: right eye milky dullness of cornea with stippled surface. On Descemet's membrane there were coarse flakes of exudate, and the iris was very hyperaemic with posterior synechiae and exudate on the lens. View further back was blocked. Left eye: cornea densely dull with numerous precipitates on the back. Iris dimly seen; with numerous posterior synechiae. Both globes normal in size and

form. No ciliary injection. Movements full. Pupils active to light. Tension normal.

Paracentesis and washing out of the anterior chambers led to appreciable clearing of the corneae. The washed out exudate was examined for spirochaetes by Burri's method, and for bacteria with the Gram stain. The exudate was also implanted into a rabbit's anterior chamber. The tests were all negative. However, an inunction treatment was carried out for three months and every attempt made to break down the synechiae with mydriatics. Gradually the corneae became clearer, the precipitates absorbed and the exudate on the lenses became smaller; but the synechiae remained practically unbroken. The iris in both eyes was tightly stretched and very atrophic. The hyperaemia disappeared gradually. At this stage the clearing pupillary regions brought to light shrinking complicated cataracts with calcareous deposits. Severe bilateral nystagmus was noted from the child's seventh month. Discission being impracticable the right cataract was extracted with escape of vitreous and subsequent phthisis bulbi. No operation was done on the left eye, but the lens shrank sufficiently to enable the child to get about with a correcting glass. So far as could be made out the fundus was not diseased. From this the author assumes that probably the right fundus was also free from disease. In this case neither histologically nor by animal experiment was the cause of the affection discoverable. Judging from the condition of the fundus the inflammation occurred probably not very long before birth.

The only other similar case on record comes from Thier, who had the opportunity of examining histologically the eyes of a child which died when three weeks old, and had been under the care of an ophthalmologist from birth because of complicated cataract. Microscopically, anterior synechiae, shrinking of the ciliary body and a complete cataract embedded in dense exudate were found. Thier labelled the condition "cyclitis foetalis," but did not tackle the question of its aetiology. From the early death of the child Stübl surmises it was a case of congenital syphilis.

D. V. GIRI.

(8) **Favory, Albert (Paris).—Concerning annular scotoma. (A propos du scotome annulaire.)** *La Clin. Ophtal.*, January, 1928.

(8) After crediting v. Graefe with the discovery of annular scotoma **Favory** complains that in France much less importance has been attached to this condition than elsewhere. At the present time, he says, annular scotoma is synonymous with retinitis pigmentosa. Without disputing the importance of retinitis pigmentosa he wishes to show that annular scotoma is frequently

due to other causes. It will suffice to abstract from the text a list of these in the order in which they are mentioned: (1) chronic choroiditis of syphilitic and myopic origin; (2) Jensen's chorio-retinitis juxta papillaris (van der Hoeve); (3) phototraumatisms such as those due to fulguration, eclipses and the prolonged fixation of the sky or of bright lights (Hancock, Jess, Frank); (4) chronic glaucoma (Lagrange, Bjerrum, Roenne, Elliot, Traquair); (5) disseminated sclerosis (Wilbrand and Uhthoff, the author himself), encephalitis (Wardenburg's case in thesis by Vialeix). Tabetic optic atrophy (Fuchs). Lead poisoning (Landolt). Papilloedema (v. Szily); (6) lesions of the chiasma (Cushing, Traquair, the author himself); (7) traumatisms of the skull (Wadsworth, Kalt, Beauvieux, Leblond, the author himself).

Favory points out that just as in the case of retinitis pigmentosa there had been long discussion as to the origin of the trouble, so now each category requires to be explained by a particular mechanism. These mechanisms are not discussed by the author in any detail. Several visual fields are illustrated and there is a bibliography which does not contain all the names mentioned in the text. Further, such misprints as Nittleship, Hancok, Eliote, Cusheng, Hirshfeld are peculiarly irritating.

ERNEST THOMSON.

NOTES

Deaths

As we go to press we hear, with great regret, of the deaths of three eminent French ophthalmic surgeons; Marc Landolt, Felix Lagrange and Camille Fromaget. We hope to publish further details at a later date.

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Treatment for an intra-corneal foreign body in the XVIth century

BENVENUTO CELLINI, in his Memoirs, tells the following story of an intra-ocular foreign body and its treatment. As he was preparing some tools to work upon his statue of Perseus, "a little bit of steel flew into my right eye, and entered so far into the pupil that it was impossible to get it out, so that I was in very great danger of losing that eye. Several days after I sent for Maestro Raffaello de' Pilli, a surgeon, who took two live pigeons, and making me lie upon my back, with a little knife opened a vein in each of their wings, so that the blood ran into my eye, and I was thereby greatly relieved. In the space of two days the bit of steel issued from my eye, and I found that I had received considerable ease and in a great measure recovered my sight."

British Medical Association, Section of Ophthalmology

AT the 96th annual meeting of the British Medical Association at Cardiff, the Section of Ophthalmology will hold meetings on July 25 and 26. The officers of the section are as follows:—President, F. P. S. Cresswell; Vice-Presidents, H. Caiger, L. V. Cargill, R. J. Coulter and F. G. Thomas; Secretaries, J. W. Tudor Thomas and Frank A. Juler. The following subjects have been arranged for discussion:—"Visual Efficiency and Working Ability," to be opened by Dr. Freeland Fergus, with Sir John Parsons and Mr. Bishop Harman. "The Aetiology of Glaucoma," to be opened by Mr. Duke-Elder, with Dr. Traquair, Mr. Thomson Henderson and Mr. Bishop Harman.

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International Ophthalmological Congress, 1929

WE are asked to announce that the fee for membership of the International Ophthalmological Congress, to be held in Amsterdam in September, 1929, is two guineas. The fee for Associate Members is one guinea. Associate Members will be invited to all the social events but will take no part in the scientific business. Cheques should be sent to the Treasurer: Mr. H. M. Roclofsz, Incasso Bank, Postcheque Konto, 8074 Amsterdam.

The Secretary of the National Committee is Professor Zeeman, The Ophthalmological Clinique, Amsterdam, and the Secretary of the International Council is Dr. E. Marx, The University Eye Clinique, Leyden. Those who intend to read papers or to take part in the discussions should communicate as soon as possible with either of these gentlemen.

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Light and Heat in Medicine, Surgery and Public Health

THE 2nd International Conference on Light and Heat in Medicine, Surgery and Public Health will be held in London from October 29 to November 1, 1928.

FUTURE ARRANGEMENTS

1928

June 8.—Royal Society of Medicine, Section of Ophthalmology (Annual).

July 4-7.—Oxford Ophthalmological Congress.

July 25-26.—Annual Meeting, British Medical Association, Section of Ophthalmology at Cardiff.

CONTEMPORARY OPHTHALMIC LITERATURE

American Journal of Ophthalmology. *March, 1928.*

WAITE, J. HERBERT. Essential progressive atrophy of the iris.
BROWN, ALBERT J. Familial rosette figure at the macula.
CLEMENS, THOMAS J. Advancement operation without destruction of tissue.
EVANS, JOHN N. Clinical method to determine the rate of macular elimination of after images (eikonoscopy).
WEEKS, WEBB W. and LANDIS, MARY. Visual field changes in arterio-sclerosis.
WILKINS, SAMUEL H. Rotor dial chart for extra-ocular muscle paralysis.
BEACH, S. JUDD. Selection of test type for refraction.
ROTH, A. Experimental basis of skiascopic phenomena.

April, 1928.

ELSCHNIG, ANTON. Corneal suture in senile cataract extraction.
LLOYD, RALPH I. Synchysis scintillans of the anterior chamber.
GREENBAUM, SIGMUND S. Syringocystoma of the eyelids.
CLARK, C. P. Atypical conjunctivitis tularensis.
SHANNON, C. E. G. and HARROSON, W. J. An instrument for muscle tucking.
HARTSHORNE, ISAAC. Loss of vitreous.
GOLDENBURG, MICHAEL. Closure of the drainage angle.

Archives of Ophthalmology. *March, 1928.*

KNAPP, ARNOLD. Glaucoma in generalized vascular naevus of the skin—report of case with angiomatous changes in the iris.
GIFFORD, S. R. Diseases of the eye and adnexa due to fungi and the higher bacteria.
COHEN, MARTIN. A case of chloroma with ocular lesions.
PACK, GEORGE T. Radiation therapy of cancers of the orbito-palpebral region at the Radium Institute of the University of Paris.
OAST, SAMUEL P. Blue sclerotics and brittle bones: report of occurrence in mother and child.
BEDELL, ARTHUR J. Photographic history of a traumatic retino-choroiditis.
JACKSON, GEORGE H. Notes on two early American works on the eye.
GILL, WILLIAM D. A way to keep the eyelids closed after infiltration anaesthesia.
SCHOENBERG, MARK J. Experience with ephedrine in ophthalmic practice.
ATKINSON, WALTER S. Two safety measures in cataract extraction.
COWAN, ALFRED. Test-cards for the determination of the visual acuity: A review.

Journal of Ophthalmology, Otology and Laryngology. *March, 1928*

ATKINSON, D. T. Corrective surgery of the nose and eyelids.
TURTZ, CHARLES A. Consanguinity in ophthalmology.

April, 1928.

HALLETT, DE WAYNE. A simple device for testing the relative visual acuity of little children.
ROWLAND, W. D. Tenotomy of inferior oblique—Case reports.

Bulletin of the Ophthalmological Society of Egypt. *1927.*

TEWFIK, MOHAMAD. Presidential address.
MEYERHOF, MAX. A short history of ophthalmology in Egypt during the XIX century.
FISCHER, J. C. Creation and development of both Ophthalmic Hospitals and Society.
OSBORNE, ALFRED. Ophthalmic development in Egypt during the last 25 years.
EL MAZNEY BEY, E. H. The ophthalmic hospitals of Egypt.
WILSON, R. P. Some aspects of research and its relation to ophthalmic problems.
IBRAHIM, FAHIM GIRGIS. A few hints on spring catarrh.
SEOUD, GALAL ABUL. Some clinical observations on monocular trachoma.

DEMETRIADES, J. A case of bilateral chicken-pox kerato-conjunctivitis.
SOBHY BEY, M. Incidence of diphtheritic ophthalmia in Egypt.
RIAD, MAHMOUD. Observations on the aetiology of corneal infiltrations.
SULIEMAN BEY, S. A. H. Eye diseases resulting from cocaine.
SOBHY BEY, M. Interstitial keratitis following trephining operation for primary chronic glaucoma.
Glaucoma simplex of the right eye with naevus (capillary angioma) of the same side of the face.
A case of acute primary glaucoma in right eye associated with secondary glaucoma in left eye due to thrombosis of central vein.
Light blue fluffy masses on the pupillary border with exfoliation of the anterior lens capsule.
EL KATTAN, M. A. Description of two cases of distant septic foci causing eye trouble.
BARRADA, YOUSSEF. Peroneal type of muscular atrophy (Charcot-Marie-Tooth) with optic atrophy.
IBRAHIM, FAHIM GIRGIS. Haemorrhagic neuro-retinitis due to pernicious anaemia.
SOBHY BEY, M. A case of transient myopia in diabetes.
EL AGUIZY BEY. Headache and other neuroses and their relation to errors in the optic apparatus (eye strain).
IBRAHIM, SALEH ALY. Treatment of lacrymal fistula by B.I.P. Paste. History of preparation.
MAGHRABY, A. M. Treatment of chronic dacryocystitis with paraffin injection.
Treatment of blepharitis and eczema of lids with ultra-violet emanations.
EL KORDY, A. K. Gumma of the lids.
OSBORNE, A. Ocular affections following intra-nasal operations.
SOBHY BEY, M. Experience with Wheeler's operation for the restoration of a contracted socket.
PERETZ, H. Concerning certain ocular injuries due to the bursting of bottles of soda water.
EL SEESY, A. M. Hole at the macula lutea after injury by a football.
HAIG, H. A. A case of melanotic tumour of the choroid presenting histological endotheliomatous characters.
SEOUD, GALAL ABUL. Case of pituitary tumour.
SOBHY BEY, M. A case of cavernous angioma of the orbit and its ablation.
CASSIMATIS, C. On a case of congenital and familial complete luxation of both lenses into the vitreous complicated finally by detachment of the retina.
BARRADA, M. A. A case of cystic globe.
EL BAKLY, M. A. Anaphylaxis in milk injections.
EL KORDY, A. K. Tutocain.
SEOUD, GALAL ABUL. Four weeks' ophthalmic work in Mecca.
FARID, NASR BEY. Blindness in Egypt.

Annales d'Oculistique. *March, 1928.*

AUBINEAU, E. Congenital entropion.
REDSLOB, E. and DUVERGER, R. Experimental researches on the influence of the PH. of the vitreous body on the calibre of the retinal vessels.
CHIAZZARO, DOMINGO. Sporular infection of the lens.
SOUMER, J. and SEGALLER-MIRON. Contribution to the study of familial nystagmus.
SÉDAN, JEAN. Juvenile cataracts with large nuclei in cured tuberculous patients.
SALVATI. Ptosis of the upper lid from the injection of alcohol in eye surgery.

Archives d'Ophtalmologie. *March, 1928*

DEJEAN, CH. Researches on the zonule of Zinn. Development, structure, topography, physiology.
ALEXIADÈO. Retrobulbar injections of alcohol combined with posterior sclerectomy, in the painful absolute glaucoma.
TOULANT, P. Multiple metastatic abscesses of the limbus.
GABRIELIDÈS, A. New procedure allowing of iridectomy in cases of complete absence of the anterior chamber.

Archives d'Ophtalmologie. *April, 1928.*

FRENKEL, HENRI. Unilateral myopia.

PAGÈS. On the treatment of so-called scrofulous or possible tuberculous affections of the eye by ultra-violet light in generous doses.

La Clinique Ophtalmologique. *February, 1928.*

FAVORY, ALBERT. The different perimetric aspects of lesions of the chiasma.

HÉBERT. Two cases of neuro-retinitis during pregnancy.

VEIL, PROSPER. Sclerokeratitis treated successfully with Vaudremer's anti-tuberculous vaccine.

MORISOT. Ionic medication in ocular therapy.

EDWARD and WECKEL. Large doses of anti-diphtheritic serum in sympathetic ophthalmia.

BURKY, EARL L. and WOODS, H. C. Proteins of the lens: a new method of preparing Beta-crystallin.

Archiv für Ophthalmologie.

SCHMELZER, HANS. On the pathology and therapy of glaucoma.

ELSCHNIG, A. On glaucoma.

GIGER, L. Observations on the diagnosis of lesions of the ocular muscles.

SEEFELDER, R. Clinical and anatomical contribution to the symptom picture of so-called sickle-shaped central degeneration of the retina.

KEIGO, KISO. Contribution to the heredity of medullated nerve fibres in the retina.

STEINDORFF, KURT. Experiments on iontophoresis, also contribution to the medical treatment of lens opacities.

WÄTZOLD and KATSUTO, GYOTOKU. On the pathogenesis of choroidal sarcoma.

GLADIN, SOPHIE. Experimental investigation of the action of the beetle, Paederus fuscipes (fam. staphylinidae) on the rabbit's eye.

OHM, J. Lever nystagmography—Its history, faults, accomplishment, and perfection.

VON PLANTA, P. The frequency of colour blindness in boys and girls and its proof by universal clinical testing.

REHSTEINER, KARL. Ophthalmoscopic investigation on senile and myopic changes in periphery of the fundus.

ISHIKAWA, FUKUMI. Experimental investigations on the occurrence of traumatic mydriasis.

BLATT, NICOLAUS. Interference in eye diseases.

Klinische Monatsblätter für Augenheilkunde. *March, 1928.*

ELSCHNIG, A. On sympathetic ophthalmia. Observations on the work of Fodor

STOEWER, E. Gold treatment in tuberculous eye diseases.

ASMUS, E. On the treatment of ocular tuberculosis with "Tebeprotein Toeniessen."

BUSACCA, A. and MELLI, G. Observations on the arrangement of cyclitic exudates on the anterior lens capsule.

ORLOFF, K. CH. On the aetiology of post-operative irido-cyclitis.

STEIN, R. Multiple abscesses of the connective tissue of the lid.

TABORISKY, I. On the occurrence of Provaczek-Halberstadt bodies in the bulbar conjunctiva.

NEMLICHER, L. J. On an unusual pupil reflex in a case of pituitary tumour with dystrophia adiposogenitalis.

LIPOWITZ, W. S. On two cases of lid deformity.

GINZBURG, J. J. On rare tumours of the optic nerves.

KRANTBAUER, G. Platino-chloride tatooing of the human eye.

KNAPP, P. Observations on the work of Krautbauer on multiple corneal tatooing.

WIEDERSHEIM, O. On the technique of observation and measurement of excursion in miners' nystagmus.

ELSCHNIG, A. On the technique of opening a shallow anterior chamber.

KREIKER, A. Keel-shaped implant of oral mucous membrane in the inter-marginal region in trichiasis.

Klinische Monatsblätter für Augenheilkunde. *April, 1928.*

GREEFF, R. On von Graefe's 100th birthday. With picture.
KOYANAGI, Y. On the pathogenesis of albuminuric retinitis.
QUINT. On siderosis and on binocular vision in unilateral aphakia.
SCHNYDER, W. F. A new finding in the region of the posterior layers of the cornea in familial corneal degeneration.
BLATT, N. Eye changes in malaria.
KUKÁN, F. Bismuth treatment of interstitial keratitis.
v. JILEK, J. and KRISZTICS, E. Trachoma and the exudative diathesis.
KREIKER, A. Notes on true atrophy of the iris.
v. GERNET, R. On implantation of the tarsus.
MELLINGHOFF, L. On securing the sutures of the anterior layers in squint operations.
BESELIN, O. Iritis from purulent tonsillitis and dental disease.
NÓNAY, T. Our experiences with glaucosan.
ZENTNER, P. Unusual frontal mucocele with compression and folding of eye.
KUBIK, J. The results of compression of the eye from narrowing of the orbit.

Zeitschrift für Augenheilkunde. *April, 1928.*

SATTLER, C. H. Apparent divergence in an eye with an abnormally great distance between fovea and papilla.
Hair suturing of slit canaliculi.
KUHLGATZ, W. Observations on cataract extraction in congenital aniridia.
GREDSTED, ALICE. Contribution to the knowledge of eye injuries by burdock.
WEIZENBLATT, SPRINZA. On unilateral senile central corneal changes.
SZYMANSKI, J. Halb-Elliot operation technique.
HORN, L. and KOGERER, H. On the treatment of tabetic optic atrophy with lumbar air injections.

Annali di Ottalmologia e Clinica Oculistica. *March, 1928.*

MAGGIORE. On the nature of the amblyopia and its connection with the ocular deviation in concomitant squint.
LOCASCIO and GIANNANTONI. Researches into vision in the region of myopia.
OVIO. Observations and considerations of "*Giovanni Poleni*" on vision.
MARINOSCI. Variations in the viscosity of the vitreous humour under the action of certain salts.
SCULLICA. Experimental ectasia of the cornea in lesions of Descemet's membrane.
BALACCO. Papillomatous epithelial invasion of the anterior chamber.
CUCCHIA. Indirect perimacular vision under physiological conditions.
PANICO. On pneumophthalmia.

April, 1928.

FILETI. Subjective stigmatoscopy in light filtered through a solution of methylene blue.
SCALZITTI. Clinical experiments on the behaviour of the pupil at the beginning and the end of atropine mydriasis.
NICHELATTI. Infra-red radiations in the treatment of some conjunctival affections, chiefly trachoma.
SCOTTI. On amaurotic family idiocy.

Archivio di Ottalmologia. *February, 1928.*

MAZZUCCONI, M. Visual acuity in connection with illumination.
FAZIO, G. The "Hemistereoscope"—New apparatus for the diagnosis of simulated monocular blindness.

March, 1928.

ARGANARAZ, RAUL and ANROQUÉ, ESTABAN. Hereditary degeneration of the macula.
BRANA, JOHANN. On the degenerative stigmata of trachoma patients.
POLICE, G. The visual elements and the radial fibres of the retina of Amblystoma mexicanum.
FAZIO, G. The "Hemistereoscope" (continued).

Bolletino d'Oculistica. *March, 1928.*

MORELLI. On familial macular degeneration.
DE LOGU. Streptothricosis of the palpebral conjunctiva.
VON BERGER. *Epithelioma of the cornea.*
LUCIANO. On a case of late fusiform traumatic cataract in a wounded soldier.

Lettura Oftalmologica. *February, 1928.*

TESSIER, G. Conjunctival tuberculosis and its prognosis.
CUCCHIA, A. Research on the composition of the blood of cataract patients.
LODDONI, G. A case of hysterical ocular syndrome with haemorrhage.

Revista Oto-Neuro-Oftalmologica. *January-February, 1928.*

PALLESTRINI, E. Vestibular nystagmus and raised intracranial tension.
SEGUINI, A. Ocular symptomatology of tumours of the facial sinuses.
PODESTA, E. On the value in differential diagnosis of opacity of the sphenoidal sinus.

Revista Oto-Oftalmologica y de Cirurgia Neurologica.

March, 1928.

GUTIERREZ, A. *Access to the optic chiasma and the pituitary by way of the median frontal route.*
DOWLING, E. and ORLANDO, R. Prefrontal syndrome.
PAVIA, LIJO. Central oedema of the retina.
OROZCO, G. Fungus of the dura mater.

Archivos de Oftalmologìa de Buenos Aires. *February, 1928.*

ARGANARAZ, RAUL and ANDROQUÉ, ESTABAN. *Hereditary degeneration of the macula.*
DUSSELDORP, MARCELO. Trachoma in the north.

March, 1928.

CASTEX, CASAFFOUSTH and ONTANEDA. Syndrome of syphilitic periostitis of orbit.
COURTIS. Bilateral exudative choroiditis of dental origin.
DUSSELDORP. Keratitis in mumps.
BALADO and TISCORNIA. Tumour of the cerebral peduncle with subtentorial signs.
DUSSELDORP. *Cutaneous Leishmaniasis with ocular complications.*

Archivos de Oftalmologìa Hispano-Amercanos. *April, 1928.*

LUQUE, C. ESPILDORA. Contribution to the pathogenesis of thrombophlebitis of the cavernous sinus.
MARQUEZ, J. GOMEZ. The late results of dacryocysto-rhinostomy and the fundamental basis of this operation.